OPERATION AND MAINTENANCE MANUAL

FM/AM-1000S

ifr INC

MP MASTER
MA26162

FM/AM-1000S

COMMUNICATIONS SERVICE MONITOR

SUPPLEMENT PART NUMBER: 1-23-0662A

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NOTE

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FM/AM-1000S

INTRODUCTION

The FM/AM-1000S offers all the features of the FM/AM-1000A plus a versatile spectrum analyzer. A signal spectrum can be monitored by direct connection of the transmitter to the TRANS/RCVR connector or off-the-air through an antenna connected to the ANT connector. A temperature compensated crystal oscillator, (TCXO), replaces the oven stabilized oscillator of the FM/AM-1000A. The TCXO makes the FM/AM-1000S ready for use as soon as power is applied without having to wait for warm-up.

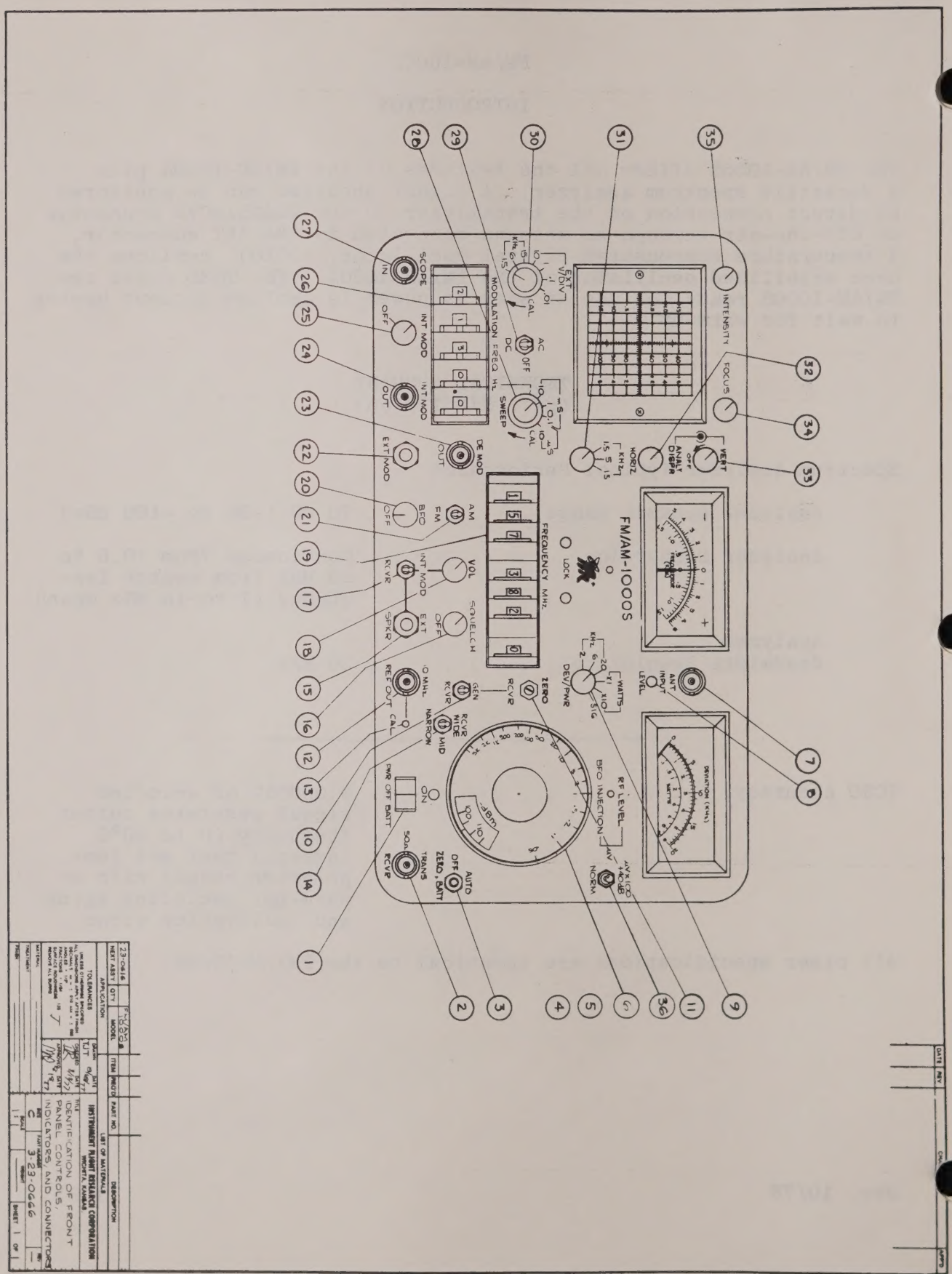
TECHNICAL SUMMARY
(Eff: S/N 170 on)

Spectrum Analyzer Typical Performance:

Analyzer Dynamic Range	70 dB (-30 to -100 dBm)
Analyzer Dispersion	Continuous from ±0.5 to ±5 MHz from center frequency (1 to 10 MHz span)
Analyzer Bandwidth Resolution	30 kHz

TCXO Accuracy	0.00001% of selected signal generator output frequency (0 to 50°C internal test set temperature range) with no warm-up, excluding aging and calibration error.

All other specifications are identical to the FM/AM-1000A.


FM/AM-1000S
INTENSITY
FOCUS
VERT
HORIZ
ANALY DISPR
SCOPE IN
INT MOD OUT
EXT MOD OUT
DE MOD
INT MOD
MODULATION FREQ. HI
SWEEP
AC
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V/DIV
CAL
FREQUENCY MHz.
LOCK
AM
FM
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SQUELCH
INT MOD
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RCVR
SPKR
REF OUT
CAL
GEN RCVR
RCVR
ZERO
DEV/PWR
WATTS
SIG
ANT INPUT LEVEL
RF LEVEL
BFO INJECTION
AUX LOG MODE
NORM
RCVR MODE
NARROW
MID
WIDE
PWR OFF BATT
ON
SQUELCH TRANS RCVR
ZERO, BATT
AUTO
OFF

| | | |

FM/AM-1000S
Controls, Indicators, and Connectors

All controls, indicators, and connectors on the FM/AM-1000S are the same as on the FM/AM-1000A except as noted on the following paragraphs. Refer to Figure 1-1A and Section I of FM/AM-1000A Manual.

2. TRANS/RCVR Connector. The TRANS/RCVR connector serves the same functions as on the FM/AM-1000A and also serves as an input to the spectrum analyzer on the FM/AM-1000S. 100 watts at the TRANS/RCVR is approximately -30 dBm on the spectrum analyzer display.

4. BATT OVEN Switch. The BATT OVEN switch is not used on the FM/AM-1000S and is deleted.

5. OVEN Lamp. The OVEN indicator is not used on the FM/AM-1000S and is deleted.

7. ANT Connector. The ANT connector serves the same functions as on the FM/AM-1000A and also serves as an input to the spectrum analyzer on the FM/AM-1000S. Maximum input at the connector is -30 dBm for proper analyzer operation. Signals above -30 dBm may cause the unit to generate and display spurious signals. A maximum continuous input of 250 mW may be applied without causing damage to the circuits.

33. VERT and ANALY DISPR Controls. The outer, VERT, control is used to position the vertical scope trace. The inner control, ANALY DISPR, controls the analyzer dispersion. With the ANALY DISPR control in the full ccw OFF position, the oscilloscope is operational as for the FM/AM-1000A. When the control is taken out of detent, the scope is disabled and the analyzer feature is activated with a dispersion of 0.1 MHz/division. When the control is adjusted full cw, the analyzer dispersion is 1 MHz/division. All of the scope controls except INTENSITY and FOCUS are disabled in the analyzer mode.

Operating Procedures for Off-the-Air Reception.

Connect an antenna to the ANT connector and set the GEN/RCVR switch to RCVR. Adjust the ANALY DISPR control full cw for wide dispersion. The analyzer will display a 10 MHz band of frequencies, ±5 MHz from the receiver frequency (the frequency selected on the FREQUENCY selector).

Operating Procedures for Off-the-Air Reception (cont'd)

The maximum signal level at the antenna input for proper analyzer operation is -30 dBm. If the transmitter signal strength is greater that -30 dBm, the antenna should be decoupled or a pad should be connected between the antenna and the monitor input. A maximum continuous input of 250 mW can be directly to the ANT connector without causing damage to the receiver circuits.

If the frequency of a transmission is not known, switch through the FREQUENCY selectors in 10 MHz increments with the ANALY DISPR control adjusted for Wide Dispersion (full cw). When the signal of interest is spotted, adjust the FREQUENCY selectors until the signal is at the center of the display and narrow the dispersion (adjust ANALY DISPR ccw) and adjust the FREQUENCY selectors in smaller increments until the FREQ ERROR meter is centered (0).

A reference can be displayed to accurately locate the center frequency of the analyzer by setting the GEN/RCVR switch to GEN.

Operating Procedures for Direct Hook-up

Spectrum analyzer operation for direct hook-up is identical to Off-the-Air reception except that the transmitter under test is connected directly to the TRANS/RCVR connector. The power versus time limits should be observed as for the FM/AM-1000A: Maximum transmitter input is 30 W at 50% duty cycle, 100 W at 15% duty cycle, or 15 W cw. Maximum on-time is 10 seconds at 100 W, 20 seconds at 50 W and 2 minutes at 30 W. 100 W at the TRANS/RCVR connector is approximately -30 dBm on the analyzer display.

Spurious Signals

When operating the spectrum analyzer in wide dispersion, there is a probability of a low level spurious signal occurring approximately 2 MHz below the center frequency for any selected frequency. Spurious signals may also occur at various other frequencies.

These spurious signals are generated by the service monitor and can be identified by switching through the 1 MHz and 100 kHz digits of the FREQUENCY selectors and noting the positions of the signal and the spurs on the display. If the spur remains at the same position relative to the signal, the spur is most likely a spurious component of that signal. If the spur moves at a different rate than, or changes position on, the signal, it is not part of the signal and is most likely being generated within the FM/AM-1000S.

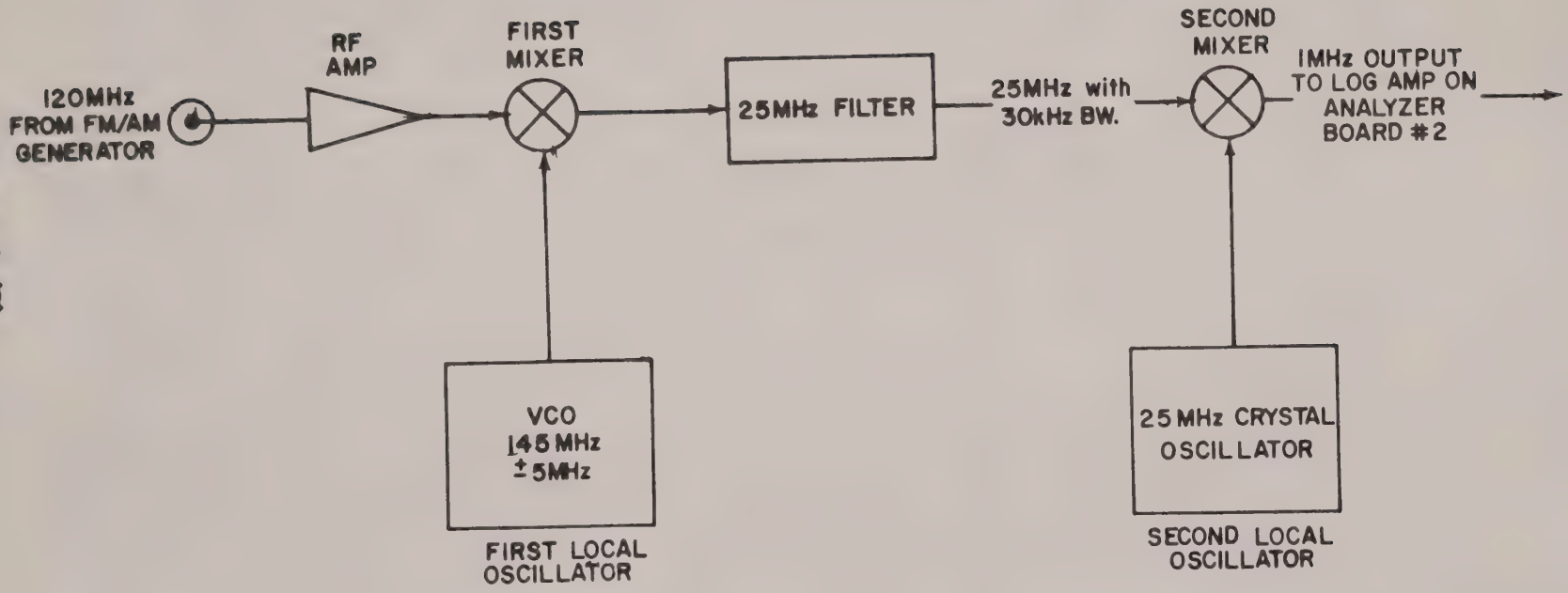


Figure 1-2 (S)

SPECTRUM ANALYZER BLOCK DIAGRAM BOARD #1 (FM/AM 1000S)

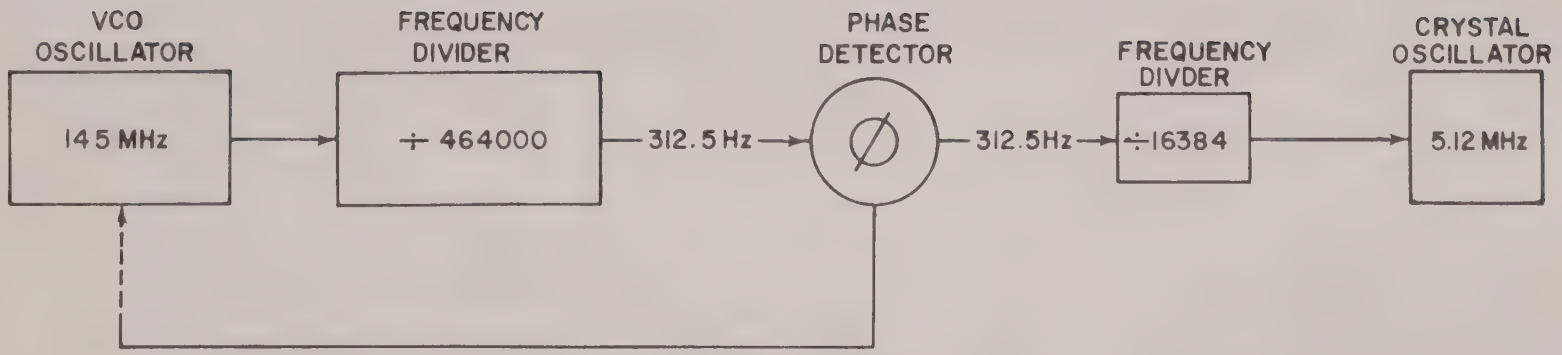


Figure 1-3(S)

SPECTRUM ANALYZER BOARD#2 PHASE LOCK BLOCK DIAGRAM

1-1. Introduction.

1-2. In the Spectrum Analyzer Mode of operation, a segment of the RF spectrum, centered on the frequency selected by the FREQUENCY MHz THUMBWHEEL SWITCH, is scanned. The Spectrum Analyzer provides a representation of signal strengths between -30 and -100 dBm for the range of frequencies scanned. The range of the frequencies covered may be varied between 1 and 10 MHz by use of the Front Panel DISPERSION CONTROL. The analyzer mode is selected by moving the ANALY DISPR control from the full ccw, detent, position.

2-1. Phase Lock and Sweep Generator System Description. (4-23-0586 & 660)

2-2. The phase lock and sweep generator system generates a horizontal sweep on the oscilloscope that represents a frequency deviation above and below a selected frequency. This deviation is called DISPERSION and is variable from ±0.5 MHz to ±5 MHz by use of the Front Panel DISPERSION CONTROL. Maximum and minimum dispersion limits are set by R39 and R37 on Spectrum Analyzer Board #1. A Voltage Controlled Oscillator (VCO) is caused to sweep in frequency by a sawtooth signal of about 18 Hz. The 18 Hz sawtooth signal is generated by sweep oscillator Q9 (2N3251A) and associated components. X3 (6741T) combines the 18 Hz sawtooth signal with a d.c. voltage produced by the phase lock system on Spectrum Analyzer Board #2. The output of X3 is used to maintain phase lock within specified limits and to control the frequency of VCO Q6 (66382). The 18 Hz sawtooth waveform is also switched to the Horizontal Sweep differential amplifiers when the Analyzer Mode of operation is selected.

2-3. The "sweeping" VCO output signal is mixed with the 120 MHz from the AM/FM Generator by dual FET Q3 (40673). The output of Q3 and crystal filter YFL1 (A6640) is the difference in frequency between the incoming IF and the VCO frequency at any given instant. The output of the crystal filter is adjusted by a shaping circuit and mixed with the output of a 26 MHz oscillator by Q4 (40673). The output of Q4 is at 1 MHz. The crystal filter YFL1 maintains the bandwidth resolution of 30 kHz. The 1 MHz output on J65608 is fed to the Vertical differential Amps via log Amp circuitry on Spectrum Analyzer Board #2. This signal is a linear response signal calibrated in dBm from -30 dBm to -100 dBm. Displayed frequency dispersion depends upon the adjustment of the Front Panel DISPERSION control. The frequency centered on the analyzer scope face corresponds to the frequency selected on the FREQUENCY MHz THUMBHWEEL SWITCH.

3-1. Phase Lock System Operation.

3-2. The 145 MHz local oscillator signal from Board #1 is inputted onto Spectrum Analyzer Board #2 on J65607. This signal is buffered by 10 by X7 (Plessey 8690). The Plessey is used because it draws only about 10ma. The output of X7 is applied to a divide-by-16 IC, X8 (74LS191). The TTL output of X8 pin 7 is applied, via a blocking capacitor to inverter X9b (CD4011). The somewhat rounded output of X9b is applied to a divide-by-2900 binary counter X10 (F4040). The output of X10 is a 312.5 Hz signal. This 312.5 Hz signal is fed to Q12 (2N2222).

3-3. The 312.5 Hz input to Q12 is converted to a sampling pulse for the sample and hold circuit as follows: Q12 inverts the 312.5 Hz square-wave signal. The output of Q12 is differentiated into narrow positive and negative pulses by C29. The positive pulses turn ON (close) X4d (CD4066). With X4d closed, X4a (CD4066) opens. X4a is known as the sampling switch. Conversely, a negative pulse at X4d turns ON X4a (closes). This allows C31 to be charged from the voltage on C30 (holding capacitor) for the duration of the pulse on X4a pin 12. This causes the ramp waveform on C30 to be sampled.

3-4. The reference oscillator for the phase lock system is a 5.12 MHz crystal controlled oscillator consisting of Y1. Q8 (2N3905) and associated components on Spectrum Analyzer Board #2. The output of the oscillator is buffered by Q9 (2N3646) and applied to the input of X2 (CD4020). X2 divides the 5.12 MHz output of the oscillator by 16384 to produce a 312.5 Hz square-wave. This signal is applied, via C40, to X4C and X4d (CD4066). The negative half cycle of the signal turns OFF (opens) X4d which in turn turns X4a ON (closes). When X4a is closed, it shorts C30, discharging it to ground. The shorting of C30 forms the retrace portion of the ramp generated at C30 when X4b is open. When X4b is open, during the positive portion of the signal at C30, C30 is allowed to charge by Q10 (2N3251A), forming a ramp. During the positive portion of the 312.5 Hz square-wave at C40, X4b closes. This discharges C30 and then the cycle repeats. This process derives the 312.5 Hz ramp on C30 from the 5.12 MHz reference oscillator.

3-5. The position of the sampling pulse in relation to the ramp on C30 determines the charge stored by C31. X5 (3130T) is used to buffer the output. The output of X5 is filtered by low pass filters consisting of R58, R59, C33 and C34. These filters are used to remove any high frequency signals from the sample and hold circuitry. At maximum dispersion, there should be a small 18 Hz signal of about 0.3V p-p

4-1. Sweep Oscillator Operation.

4-2. The 18 Hz sweep frequency is generated on Spectrum Analyzer Board #1 by an oscillator consisting of Q9 (2N3251A), C35 and associated components. Min and Max dispersion controls affect the amplitude and linearity of the 18 Hz sawtooth sweep signal. This signal causes the VCO Q6 to sweep on either side of the center frequency of 145 MHz. The output of X3 is a combination of the 18 Hz sweep signal and the phase detector voltage from Spectrum Analyzer Board #2. This allows the oscillator to sweep and remain phase locked at the same time. The output signal from S3 is applied to the 145 MHz oscillator varactor, CR1, (PCO-600-D), through L10. L10 is adjusted to the center frequency of 145 MHz when the Max. DISP. control R39 on Spectrum Analyzer Board #1 is at zero, fully ccw.

5-1. +5V and +11V Regulators.

5-2. Q5 (2N2222) provides +5V dc to Q13, X7, and X8. No adjustment is provided for this regulator, but it is important to check that this voltage is +5 volts. The +11V regulator on Spectrum Analyzer Board #2 consists of X6 (741), Q11 (2N3638A) and associated components. This regulator operates in the SPECTRUM ANALYZER mode only. R43 is used to adjust the output of the regulator to the voltage desired.

6-1. RF System Operation.

6-2. The RF circuitry on Spectrum Analyzer Board #1 is divided into three sections. The first section, 120 MHz ±5 MHz, receives the 120 MHz signal from the FM/AM-1000S 2nd mixer via coax No. 42 and applies it to Q1 (66382). Q1 and Q2 (66382) amplify the 120 MHz signal and feed it to Q3. In the second section (25 MHz) Q3 mixes the 120 MHz signal with the output of the 145 MHz VCO. The VCO varies ±5 MHz from 145 MHz at maximum dispersion. This allows the entire spectrum of the first section to be scanned at Q3. Note that the horizontal display scan is synchronized with the VCO 18 Hz sweep rate. The resultant 25 MHz signal is filtered by C10, C11, L4, C22, C13 and L5. This signal has a bandwidth resolution of 30 kHz due to crystal filter YFL1. In the third section (1 MHz) the 25 MHz signal is then mixed with the output of a 26 MHz crystal oscillator, Q8 & Y1, by Q4. This results in a 1 MHz output of Q4. This signal also has a bandwidth resolution of 30 kHz and is outputted to Spectrum Analyzer Board #2 on J65607.

6-3. The power for the IF amplifier and the Log Amp on Spectrum Analyzer Board #2 is supplied by a +5.5 V regulator. This regulator consists of Q2 (2N2222) and associated components. The +5.5 V regulator powers Q1 (66382), the input emitter follower; amplifier Q3 (2N3905); and X3 (3130T), output buffer amp.

6-4. The Log Amplifier chip X1 (SN76502) contains four logarithmic amplifiers, only three of which are used. The output of X1 is the log sum of all inputs. The first input to X1, pin 7, is set by R4. R4 also varies the gain of the other two amplifiers feeding X1.

6-5. The 1 MHz IF signal from R4 in the emitter circuit of Q1, is applied to X1 pin 7 via a 1:1 transformer. T1 (Mini-circuits lab T1-1). The output of a 30 dB gain amplifier, consisting of Q4 (2N3905), Q5 (2N3903) and associated components, is fed to the 2nd Log Amp input, X1 pin 4. The amp 1 gain pot, R13, sets the gain of this amp to 30 dB by adjusting the emitter voltage of Q4. The output of Q5 is applied to X1 pin 4 and to the base of Q6 (2N3905). Q6 , Q7 (2N3903) and associated circuitry comprise the 30 dB gain amplifier #2. Operation of this amplifier is the same as for the 30 dB gain amplifier #1. The output of Q7 is applied to X1 pin 12. The gain of amp #2 is set by R22.

6-6. The output of X1 pins 10 & 11 is applied to a 1:3 step-up transformer T2 (Minicircuits T9-1). Q3 (2N3905) and a tuned circuit consisting of C10, C11 and L3 are tuned up 1 MHz, with a bandpass of 30 kHz. C11 is adjusted for flatness at the top of this 1 MHz, 30 kHz wide response signal. Q3 is coupled, via C12, to a detector consisting of CR5, CR6 (HP2800) and associated circuitry. Diodes CR1-CR4 (1N4148), in the 30 dB gain amps #1 & #2, limit the input voltages to X1.

7-1. Detector Circuit Operation.

7-2. The output of the detector diode CR5 is applied to the Vertical Gain pot R29. R25 and R26 provide the d.c. reference voltage for CR5. CR6 and its bypass capacitor C21 are used to provide temperature compensation for CR5. The Vertical Centering pot R30 is used to set the vertical centering of the oscilloscope display in the Analyzer mode. The output of the Vertical Gain pot R29 is applied to the noninverting (+) input of op amp X3. X3 has a gain of 4. The output of X3 is routed to the Main Scope Board Vertical Differential amplifiers Q4 & Q5 (RCA 40321) via X3a (CD4066), also located on the Main Scope Board.

8-1. Vertical Amp Operation (4-23-0612).

8-2. The vertical input amplifier, X2 (3130T), on the main scope board is capable of amplifying a very small input signal and requires only a +11V supply. L1 has been added to the vertical Gain circuit to eliminate parasitic oscillation in the 100 kHz to 1 MHz range. C2 is adjusted to prevent the particular op amp is use from oscillating. Adjustment of C2 requires that the vertical vernier on the Front Panel be rolled down all the way and then decreasing the capacitance of C2 until X2 begins oscillating. The capacitance of C2 is then increased until X2 stops oscillating. C6 and R12 connected between the emitters of Q4 and Q5 (RCA 40321) are used to boost the high frequency gain of this circuit.

9-1. Horizontal Amplifier Operation (4-23-0612).

9-2. The inputs to the Horizontal and Vertical Differential Amplifiers are switched by FET switches X5c, X3a, X3c, X3d, X8a, X8c, & X8d (CD4066). When the Spectrum Analyzer mode is selected, +11V dc is applied to plug 2 pin 6. This applies power to a blanking circuit for the spectrum analyzer and also applies +11 V to the FET switches. These FET switches, mentioned above, control the spectrum analyzer inputs to the Output Differential Amps and turn OFF the internal scope inputs to these differentials in the Spectrum Analyzer mode of operation.

9-3. The Horizontal Differential Output Amp consists of Q16, Q17 (RCA 40321) and associated components. Horiz Gain pot R61 provides an adjustment of the gain of this amplifier and may have to be set at maximum for operation in the Spectrum Analyzer mode.

10-1. Blanking Circuit Operation (3-23-0665).

10-2. An optical isolator U1 (HP50824330) is used in the inverter section so that the blanking signal from the Main Scope PC Board may be of a lower voltage. Use of an optical isolator also speeds up the response of the blanking circuit and adds to its stability. The optical isolator driving diode is driven by Q12 (2N2222) on the Main Scope PC Board for normal oscilloscope sweep operations and by Q9 (2N3251A) on the Main Scope PC Board for Spectrum Analyzer blanking.

10-3. On the Main Scope PC Board, the sweep signal from the Analyzer is inputted by X7 (CA3130). This signal is differentiated so that blanking occurs on the retrace portion of the sweep signal, in the Analyzer Mode. In the Oscilloscope Mode of operation, the blanking pulse is derived by Q12

10-3. (2N2222) and associated circuitry from the sweep oscillator. The oscilloscope sweep oscillator is an astable multivibrator consisting of Q10, Q11 (2N3646) and associated components.

11-1. Inverter Board Operation (3-23-0665).

11-2. The FM/AM-1000S Inverter Board incorporates a transistor, Q4 (2N2222), and a smaller starting capacitor, C9, in place of the large capacitor used on the FM/AM-1000A Inverter Board. This circuit supplies a start impulse to the inverter. After operation of the Inverter has begun, it provides the bias for self sustaining operation until a high voltage arc or other interruption occures. This action is designed to prevent burn-up of the High Voltage Scope Board. The grid of the CRT tube is connected to the -2000V output of the inverter via a 56K protection resistor. This resistor helps to prevent impulse currents from going to extremely high levels when an arcing or ground problem occures.

11-3. Optical isolator U1 is used to turn Q1 (RCA 40321) OFF and ON. When Q1 turns OFF, The CRT cathode goes positive with respect to the grid. This blanks the CRT trace. Zener diode CR8 (1N5278) is used to protect Q1 and U1 during a high voltage arc. R21 is also used to protect the optical Isolator during a high voltage arcing situation.

SPECTRUM ANALYZER PERFORMANCE EVALUATION

(FM/AM-1000S only)

5.10 Introduction.

5.10.1 This section contains procedures to verify the proper performance of the FM/AM-1000S Spectrum Analyzer. If the Spectrum Analyzer fails to meet the performance as outlined in this section refer to the appropriate calibration section of this manual.

5.10.2 Equipment needed.

5.10.3 An external signal generator is used to produce the test signals used in checking the Spectrum Analyzer. The signal generator used must be stable and capable of generating RF frequencies above 10.0 MHz at signal levels between -30 dBm and -100 dBm. The IFR 750, 1000 and 401 series test sets may be used to generate the needed signals. Such signal generators as the Wavetek model 3000 may also be used in making these tests.

5.10.4 Initial Test Set Up.

5.10.5 With power off, use a short length of coaxial cable to connect the output of the signal generator to the ANT Connector of the unit under test. Adjust the signal generator for the frequency desired at a signal level of -30 dBm. Set the controls on the FM/AM-1000S as follows:

BFO Control - OFF, detent, full ccw
GEN/RCVR Switch - RCVR
INT MOD Control - OFF, detent, full ccw
FREQUENCY MHz Thumbwheel - To Frequency desired above 10.0 MHz (Typically 120 MHz)
ANALY DISPR Control - For Max. Dispersion, full cw

5.10.6 Test Procedure.

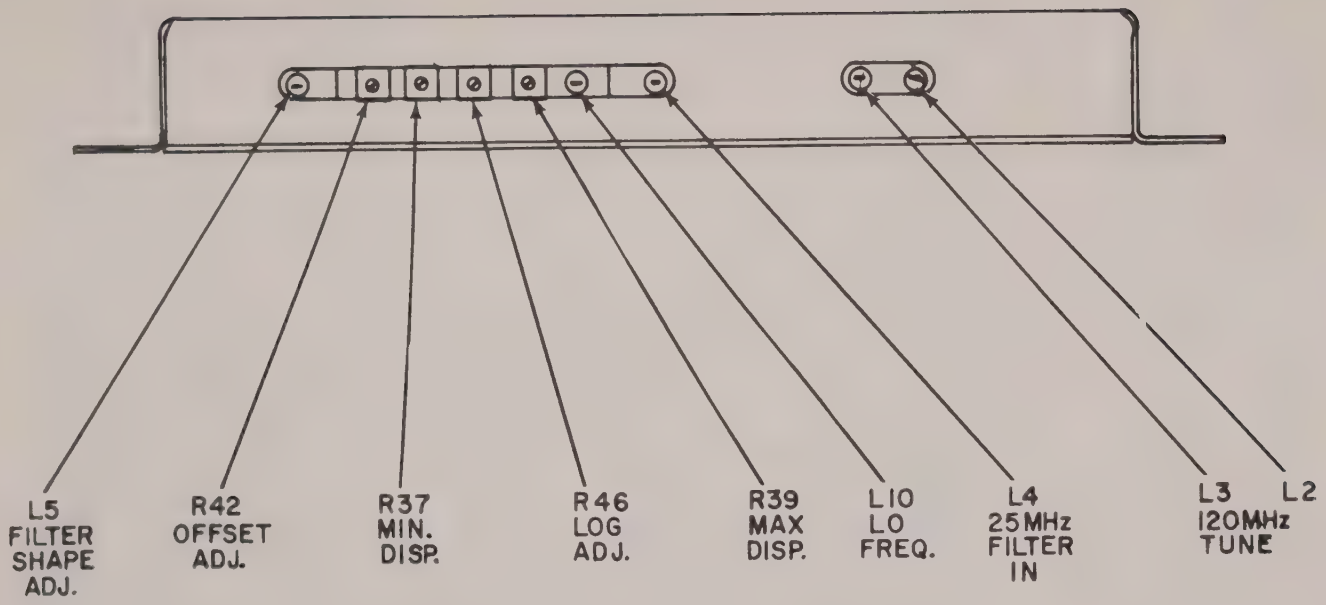
5.10.7 Turn power to the set ON and observe a displayed signal level of about -30 dBm on the Spectrum Analyzer centered on the graticule. Increase the frequency selected on the unit under test in 1.0 MHz increments. Note that the displayed signal shifts left approximately 1 major division for each 1 MHz step.

5.10.7.1 Return the FREQUENCY MHz Thumbwheel to its original position. Decrease the frequency selected in 1.0 MHz increments. Note that the displayed signal shifts right about 1 major division for each 1 MHz step.

5.10.7.2 Return the FREQUENCY MHz Thumbwheel to its original position. Set the ANALY DISPR Control for Min. dispersion, just cw of the detent position. Increase the frequency selected on the FREQUENCY MHz Thumbwheels in 100 kHz increments. Note that the displayed signal shifts left approximately 1 major division for each 100 kHz step.

5.10.7.3 Return the FREQUENCY MHz Thumbwheel to its original position. Decrease the frequency selected on the FREQUENCY MHz Thumbwheels in 100 Hz increments. Note that the displayed signal shifts right approximately 1 major division for each 100 kHz step.

5.10.7.4 Return the FREQUENCY MHz Thumbwheel to its original position. Decrease the output of the signal generator in 10 dBm steps from -30 dBm to -100 dBm. Note that the displayed signal level is approximately equal to the output level of the signal generator.



SPECTRUM ANALYZER MODULE #1 CALIBRATION ACCESS DRAWING

Figure 1-4 (S)

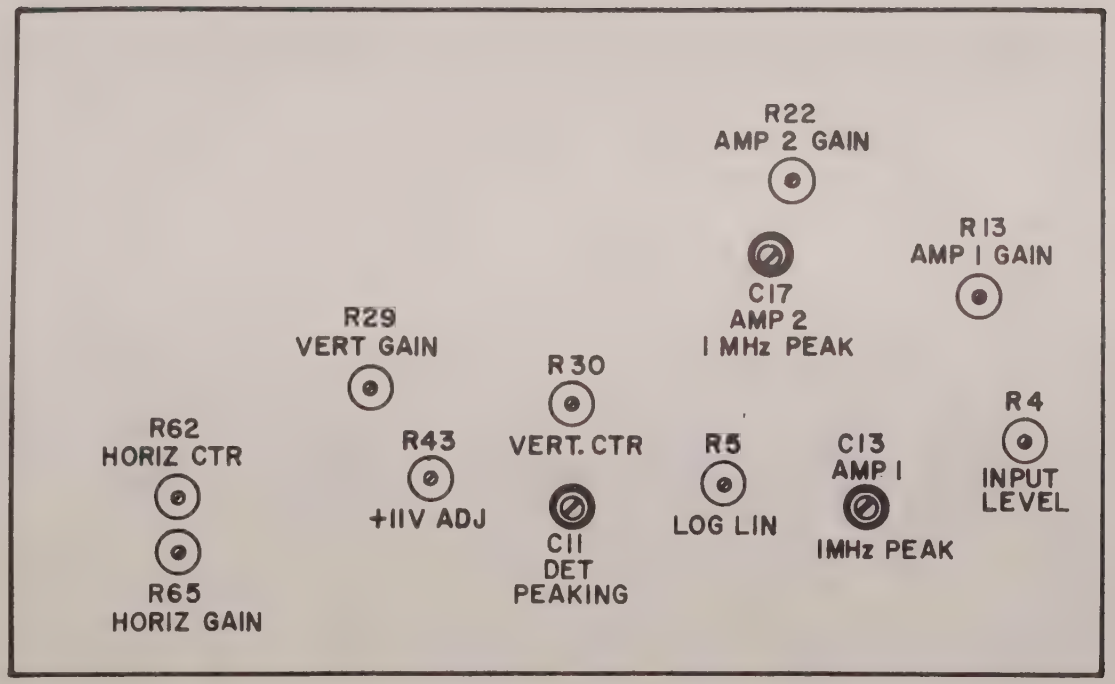


Figure 1-5(S)

SPECTRUM ANALYZER MODULE #2 CALIBRATION ACCESS DRAWING

SPECTRUM ANALYZER CALIBRATION

(FM/AM-1000S only)

6.9 Introduction.

6.9.1 This section contains procedures to calibrate the Spectrum Analyzer section of the FM/AM-1000S. It is not at this time recommended that the user attempt any adjustment or repair of the FM/AM-1000S Spectrum Analyzer not covered specifically in this section. If a malfunction should occur please contact the IFR Customer Service Department or the nearest IFR authorized repair station for further instructions.

6.9.2 Equipment Needed.

6.9.3 An external signal generator is used to produce the test signals used in calibration of the Spectrum Analyzer. The signal generator must have good stability and be capable of generating a RF frequency of 125.5 MHz at signal levels between -30 dBm and -100 dBm. The IFR 750, 1000 and 401 series test sets may be used to generate the needed signals. Such signal generators as the Wavetek model 3000 or equivalent may also be used in calibration.

6.9.4 Initial Test Set Up.

6.9.5 Set the controls on the FM/AM-1000S as follows:

BFO Control - OFF, detent, full ccw
GEN/RCVR Switch - RCVR
INT MOD Control - OFF, detent, full cw
FREQUENCY MHz Thumbwheels - 125.5000 MHz
ANALY DISPR Control - For Min. dispersion, just cw of the detent position.

6.9.6 Signal Strength Adjustments.

6.9.7 Turn power to the set ON and observe a bottom trace at -108 to -109 dBm. If this trace is not within tolerance, adjust the VERT CTR pot R30 on Spectrum Analyzer Board #2 until the bottom trace is within tolerance. If the bottom trace is adjusted by more than ±1.0 dBm, use the following procedure.

6.9.7.1 With the power to the FM/AM-1000S OFF, use a short length of coaxial cable to connect the output of the external signal generator to the ANT Connector of the FM/AM-1000S. Adjust the signal generator for a 125.5000 MHz output at -40 dBm. Turn power to the FM/AM-1000S ON and observe a displayed signal strength of -40 dBm (±1.0 dBm). If this signal is within tolerance, go to paragraph 6.9.8. If this signal is not within tolerance, use the following procedure.

6.9.7.2 Adjust the output of the signal generator for a signal strength of -60 dBm. Adjust the LOG LINEARITY pot R5 on Spectrum Analyzer Board #2 full ccw. Adjust the VERT GAIN pot R29 on Spectrum Analyzer Board #2 for a displayed signal strength of -60 dBm (±1.0 dBm). Adjust the VERT CTR pot R30 on Spectrum Analyzer Board #2 for a bottom trace at -108 to -109 dBm. Repeat this procedure as necessary until the bottom trace and the displayed signal strength are within tolerance.

6.9.8 Adjust the output of the signal generator to -50 dBm and observe a displayed signal strength of -50 dBm (±1.0 dBm). If this is not within tolerance, adjust the IF GAIN pot R4 on Spectrum Analyzer Board #2 until the displayed signal strength is -50 dBm (±1.0 dBm).

6.9.9 Adjust the output of the signal generator to -90 dBm and observe a displayed signal strength of -90 dBm (±1.0 dBm). If this is not within tolerance, adjust the AMP 2 GAIN pot R22 on Spectrum Analyzer Board #2 until the displayed signal strength is -90 dBm (±1.0 dBm).

6.9.10 Adjust the output of the signal generator to -40 dBm and observe a displayed signal strength of -40 dBm (±1.0 dBm). If this signal is not within tolerance, adjust the LOG LINEARITY pot R5 until the displayed signal strength is -40 dBm (±1.0 dBm).

6.9.11 Adjust the output of the signal generator to -30 dBm and observe a displayed signal strength of -30 dBm (+1.0 dBm, -1.5 dBm). If this signal is not within tolerance, readjust the LOG LINEARITY pot R5 for a displayed signal strength of -30 dBm (+1.0 dBm, -1.5 dBm).

6.9.12 Adjust the output of the signal generator to -40 dBm and observe the displayed signal level. If this displayed signal is not within tolerance, again adjust the LOG LINEARITY pot R5 until the displayed signal shows a signal strength error equal to one half of the algabraic sum of the signal strength errors observed in this and in the preceding paragraph.

6.9.13 Adjust the output of the signal generator to -70 dBm and observe a displayed signal level of -70 dBm (±1.0 dBm). If this is not within tolerance, adjust the AMP 1 GAIN pot R13 on Spectrum Analyzer Board #2 for a displayed signal strength of -70 dBm (±1.0 dBm).

6.9.14 Adjust the output of the signal generator to -90 dBm and observe a displayed signal level of -90 dBm (±1.0 dBm). If this signal is not within a tolerance, adjust the AMP 2 GAIN pot R22 for a displayed signal strength of -90 dBm (±1.0 dBm).

6.9.15 Adjust the output of the signal generator to -70 dBm and observe a displayed signal level of -70 dBm (±1.0 dBm). If this displayed level is not within tolerance, adjust the AMP 1 GAIN pot R13 for a displayed signal level of -70 dBm (±1.0 dBm).

6.9.16 Adjust the output of the signal generator to -90 dBm and observe a displayed signal level of -90 dBm (±1.0 dBm). If the displayed level is not within tolerance, adjust the AMP 2 GAIN pot R22 until the displayed signal shows a signal strength error equal to one half the algabraic sum of the signal strength errors observed in this and in the preceding paragraph.

6.9.17 Adjust the output of the signal generator to -30 dBm and observe a displayed signal strength of -30 dBm (+1.0 dBm, -1.5 dBm). Decrease the output of the signal generator in 10 dBm increments down to and including -100 dBm. Observe the displayed signal strength at each level to be within ±1.0 dBm of the output of the signal generator. If the displayed signal strength of any level is not within tolerance, contact the IFR Service Department or the nearest IFR authorized repair station for further instructions.

6.9.18 Horizontal Centering and Bandwidth Adjustment.

6.9.19 Adjust the output of the signal generator to -40 dBm. Adjust the ANALY DISPR control for Min. dispersion, just cw of the detent position. Observe the displayed signal to be horizontally centered on the center line of the graticule. If this signal is not within tolerance, adjust the HORIZ CTR pot R62 on Spectrum Analyzer Board #2 until the peak of the displayed signal is horizontally centered on the center line of the graticule.

6.9.20 Observe that the extreme right edge of the trace on the Spectrum analyzer is aligned with the right edge of the Analyzer Bezel (5.4 divisions right of center). If it is not, adjust the HORIZ GAIN pot R65 on Spectrum Analyzer Board #2 until the extreme right edge of the trace is aligned properly. Next, readjust the HORIZ CTR pot R62 until the peak of the displayed signal is horizontally centered. Repeat as necessary.

6.9.21 Adjust the ANALY DISPR Control for Max. dispersion, full cw. The displayed signal should be centered on the center line of the graticule (±100 kHz).

6.9.22 Select 130.5000 MHz on the FREQUENCY MHz Thumbwheel of the FM/AM-1000S. Adjust the MAX DISP pot R39 on Spectrum Analyzer Board #1 until the displayed signal is centered on the fifth major division left of the graticule center (±100 kHz).

6.9.23 Select 120.5000 MHz on the FREQUENCY MHz Thumbwheels of the FM/AM-1000S. Observe the position of the peak of the displayed signal. Adjust the MAX DISP pot R39 until the horizontal distance from the peak of the signal to the proper graticule is one half the algabraic sum of the dispersion errors observed in this and in the preceding paragraph.

6.9.24 Select 130.5000 MHz on the FREQUENCY MHz Thumbwheels of the FM/AM-1000S. Observe the position of the peak of the displayed signal.

6.9.25 If the steps in the preceding paragraphs fail to align the signal to within tolerance, contact the IFR Customer Service Department or the nearest IFR authorized repair station for further instructions.

6.9.26 Adjust the ANALY DISPR Control for Min. dispersion, just cw of the detent position. Select 126.0000 MHz on the FREQUENCY MHz Thumbwheels of the FM/AM-1000S. Adjust the MIN DISP pot R37 on Spectrum Analyzer Board #1 until the peak of the displayed signal is centered on the fifth major division to the left of center.

6.9.27 Select 125.0000 MHz on the FREQUENCY MHz Thumbwheels of the FM/AM-1000S. Adjust the MIN DISP, pot R37 until the horizontal distance from the peak of the signal to the proper graticule is one half the algabraic sum of the dispersion errors observed in this and in the preceding paragraph.

6.9.28 If the steps in the preceding paragraphs fail to align the signal to within tolerance, contact the IFR Customer Service Department or the nearest IFR authorized repair station for further instructions.

SPECTRUM ANALYZER +11V REGULATOR SERVICING

1.1 If the FM/AM-1000S operates normally in the Oscilloscope Mode but no trace appears in the Spectrum Analyzer mode, this may indicate a malfunction of the +11.0V regulator on Spectrum Analyzer Board #2.

1.2 The procedure for determining whether or not the 11.0V regulator is malfunctioning is as follows:

1. Remove AC power cord from the FM/AM-1000S.
2. Remove case from the FM/AM-1000S.
3. Remove the two retaining Phillips screws on the lower floor guide rail (These screws are located on the bottom front of the guide rail).
4. Remove the lower floor guide rail rear retaining screw. This screw is countersunk into the back end of the guide rail.
5. Making sure it does not short against anything, fold the Lower Floor down.
6. Reattach the AC Power Cord and apply power to the set.
7. Measure an input voltage of +12V on feedthrough FL4. FL4 is connected to a red wire and is the 4th feedthrough from the rear of the module. If 12V is not present, a problem exists in the 12V power supply of the FM/AM-1000S.
8. Measure an output voltage of +11.0V on FL6. FL6 is connected to a red and white wire and is the 6th feedthrough from the rear of the module.
   If the voltage on FL6 is incorrect or no voltage is present remove Spectrum Analyzer Board #2 as follows:

   a. TURN THE SET OFF AND REMOVE THE AC POWER CORD FROM THE SET!
   b. Remove the 4 Phillips head retaining screws from around the perimeter of Spectrum Analyzer Module #2. The module may now be pulled out a short distance from the set.
   c. Remove the two Phillips head screws on each end of the module. Next remove the module cover.

9. Make sure that nothing is shorting, reconnect the AC Power Cord and apply power to the set.
10. Measure the voltage on X6 pin 2. This voltage should be 6.2V. If the voltage on X6 pin 2 is not 6.2V, remove the power from the set. Measure the forward resistance of CR7, about 40Ω. Replace CR7 if necessary. Measure the voltage on X6 pin 6. This voltage should be from 10.0V to 10.3V.
11. Measure the voltage on the collector of Q11. This voltage should be +11.0V.

12. Replace X6 or Q11 as necessary.

    a. TURN THE SET OFF AND REMOVE THE AC POWER CORD FROM THE SET.
    b. Disconnect the two coaxes and the plug from the module. NOTE: Be extremely careful in removing this plug, broken wires may result.
    c. Remove the module from the set.
    d. Remove the ¼" nuts on the coax connectors on the module.
    e. Remove the #2 phillips screw in the corner of the module case.
    f. The PC Board may now be gently removed a short distance from the module shell. The PC board will remain attached to several wires. Do Not desolder any of these wires.

13. After X6 or Q11 has been replaced, connect a +12.0V external power supply to FL4 and measure the voltage output on the collector of Q11.
14. Disconnect the external power supply and reconnect the plug to the module. Reconnect the +12.0V external power supply and measure the voltage at the collector of Q11. If this voltage is not +11.0V Spectrum Analyzer Module #1 is suspect.

SECTION VII

FM/AM-1000S
PARTS LIST

This Parts List is supplemental to the FM/AM-1000A Parts List and reflects assemblies and components peculiar only to the FM/AM-1000S model.

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Dwg. Ref. Symbol	Part No.	IFR Stock No	Description	Qty Per Assy
	7.13 Front Panel Assy. 1-23-0616			
4-23-0640		1-23-0616	Front Panel Assy.	REF
		3-23-0615	•Front Panel Overlay	1
		1-23-0636	•Front Panel Wire Harness Assy.	1
	7.14 Mother Board Assy. 1-23-0637			
4-23-0640		1-23-0637	Mother Bd. Assy.	REF
Q1	SJE1461		•Transistor, MOTOROLA/ Equiv.	1
K1			•Relay, RCL ELECTRONICS/ Equiv.	1
	7.15 Upper Floor Assy. 1-23-0644			
4-23-0640		1-23-0644	Upper Floor Assy.	REF
	252-3503		•TCXO, VECTRON/Equiv.	1
2-23-0623		1-23-0620	•TCXO Output Dist. Amp. Assy	1
		1-23-0618-1	••Enclosure Base	1
		1-23-0618-2	••Enclosure Cover	1
		1-23-0619	••TCXO PC Bd Assy.	1
		1-23-0613	•••TCXO PC Bd.	1
Q1 & 4	2N3905		•••Transistor, NATIONAL/Equiv.	2
Q2, 3, 5, & 6	2N3646		•••Transistor, GE/ Equiv.	4
J62301 thru J62305	17-0204-002		•••Connector, AEP Equiv.	5

Dwg. Ref. Symbol	Part No.	IFR Stock No.	Description	Qty Per Assy
	7.16 Spectrum Analyzer Assy. 1-23-0626			
4-23-0656		1-23-0626	Spectrum Analyzer Assy.	REF
		3-23-0669	·Front Plate Assy.	1
		1-23-0668	··Vertical Gain Switch Assy.	1
		1-23-0667	··Horizontal Sweep Switch Assy.	1
		2-23-0617	·Graticule	1
		3-23-0622	·Spectrum Analyzer Right Side Frame	1
		3-23-0631	·Spectrum Analyzer Left Side Frame	1
		1-23-0625	·Spect. Anal. Main P.C. Bd. Assy.	1
		1-23-0632	·Spect. Anal. Module #1 Assy.	1
		1-23-0633	·Spect. Anal. Module #2 Assy.	1
		1-23-0624	·Spect. Anal. Inverter P.C Bd. Assy.	1
4-23-0612		1-23-0625	Spect. Anal. Main P.C. Bd. Assy.	REF
		2-23-0604	·Spect. Anal. Main P.C. Bd.	1
X1 & 9	SN72741		··Op Amp., TI/Equiv.	2
X2, 4 & 7	CA3130T		··Op. Amp., RCA/Equiv.	3
X3, 5 & 8	CD4066		··Logic, RCA/Equiv.	3
X6	SN72709		··Op. Amp. TI/Equiv.	1
Q1	2N2905		··Transistor, RCA/Equiv.	1

Dwg. Ref. Symbol	Part No.	IFR Stock No.	Description	Qty Per Assy
4-23-0612		1-23-0625	Spect. Analy Main P.C. Bd. Assy. (cont'd)	REF
Q2, 6 12 & 18	2N2222		••Transistor, MOTOROLA/ Equiv.	4
Q4, 5 16, & 17	40321		••Transistor, RCA/Equiv.	4
Q7, 8, 9, 14 & 15	2N3251		••Transistor, NATIONAL/ Equiv.	5
Q10 & 11	2N3646		••Transistor, GE/Equiv.	2
CR1	LM329CZ		••Zener Diode, NATIONAL/ Equiv.	1
CR2, 3, 8 thru 12	1N4148		••Diode, DICKSON/Equiv.	7
CR4	1N5231		••Diode, DICKSON/Equiv.	1
CR13	1N5229		••Diode, DICKSON/Equiv.	1
R6	62-2-1-202		••Trim Pot., SPECTROL/ Equiv.	1
R8	62-2-1-201		••Trim Pot., SPECTROL/ Equiv.	1
R40 & 61	62-2-1-502		••Trim Pot., SPECTROL/ Equiv.	2
R58	62-2-1-103		••Trim Pot., SPECTROL/ Equiv.	1
R67	62-2-1-102		••Trim Pot., SPECTROL/ Equiv.	1
C2	DV11PS35D		••Trim Cap., ELMENCO/ Equiv.	1
4-23-0660		1-23-0632	Spect. Anal. Module #1 Assy.	REF
		2-23-0628	•Cover	1
FL1 thru 6	51-713-002		•Feedthru Filter, SPECTRUM CONTROLS/Equiv.	6

Dwg. Ref. Symbol	Part No.	IFR Stock No.	Description	Qty Per Assy
4-23-0660		1-23-0632	Spect. Anal. Module #1 Assy.(cont'd)	REF
		3-23-0621	·Enclosure	1
		1-23-0593	·Spect. Anal. Module #1 P.C. Bd. Assy.	1
		1-23-0587	··Module #1 PC Bd.	1
X1 & 2	RC4558		···Op. Amp., TI/Equiv.	2
X3	CA6741T		···Op. Amp., RCA/Equiv.	1
X4	SN72741L		···Op. Amp., TI/Equiv.	1
YFL1	A6640		···Crystal Filter, Heath Dynamics	1
Y1		3-76-063-78	···Crystal, 26.000 MHz	1
CR1	PCO600D		···Diode, PARAMETRICS/ Equiv.	1
CR2	1N4148		···Diode, ITT/Equiv.	1
X5	CA3019		···Diode, Array, RCA/ Equiv.	1
Q1, 2, 6 & 7	66382		···Transistor, RCA/Equiv.	4
Q3 & 4	40673		···Transistor, RCA/Equiv.	2
Q5	2N2222		···Transistor, MOTOROLA/ Equiv.	1
Q8	2N3905		···Transistor, NATIONAL/ Equiv.	1
Q9	2N3251		···Transistor, NATIONAL/ Equiv.	1
R37	62-2-1-504		···Trim Pot., SPECTROL/ Equiv.	1
R39	62-2-1-501		···Trim Pot., SPECTROL/ Equiv.	1
R46	62-2-1-503		···Trim Pot., SPECTROL/ Equiv.	1

Dwg. Ref. Symbol	Part No.	IFR Stock No.	Description	Qty Per Assy
4-23-0586		1-23-0633	Spect. Anal. Module #2 Assy.	REF
		2-23-0629	•Cover	1
FL1 thru 6	51-713-002		•Feedthru filters/SPECTRUM CONTROLS/Equiv.	6
		3-23-0630	•Enclosure	1
		1-23-0594	•Spect. Anal. PC. Bd. #2 Assy.	1
		1-23-0588	••Spect. Anal. P.C. Bd. #2	1
X1	SN76502		•••IC, TI/Equiv.	1
X2	CD4020		•••IC, RCA/Equiv.	1
X3 & 5	CA3130T		•••IC, RCA/Equiv.	2
X4	CD4066		•••IC, RCA/Equiv.	1
X6	SN72741L		•••IC, TI/Equiv.	1
X7	PL8690		•••IC, PLESSEY/Equiv.	1
X8	SN74LS191		•••IC, TI/Equiv.	1
X9	CD4011		•••IC, RCA/Equiv.	1
X10	F4040		•••IC, FAIRCHILD/Equiv.	1
X11	CD4068		•••IC, RCA/Equiv.	1
Q1 & 13	66382		•••Transistor, RCA/Equiv.	2
Q2, 12 & 14	2N2222		•••Transistor, MOTOROLA/Equiv.	3
Q3, 4, 6, & 8	2N3905		•••Transistor, NATIONAL/Equiv.	4
Q5 & 7	2N3903		•••Transistor, NATIONAL/Equiv.	2

Dwg. Ref. Symbol	Part No.	IFR Stock No.	Description	Qty Per Assy
4-23-0586		1-23-0633	Spect. Anal. Module #2 Assy. (cont'd)	REF
Q9	2N3646		···Transistor, GE/Equiv.	1
Q10	2N3251		···Transistor, NATIONAL/ Equiv.	1
Q11	2N3638A		···Transistor, FAIRCHILD/ Equiv.	1
CR1 thru 4	1N4148		···Diode, DICKSON/Equiv.	4
CR5 & 6	HP2800		···Diode, H-P/Equiv.	2
CR7	LM329CZ		···Diode, NATIONAL/Equiv.	1
T-1	T1-1		···Transformer, MINI CIRCUITS LAB/Equiv.	1
T-2	T9-1		···Transformer, MINI CIRCUITS LAB/Equiv.	1
Y1		3-37-0063-79	···Crystal, 5.12 MHz	1
R4, 30 & 43	62-1-1-202		···Trim Pot, SPECTROL/ Equiv.	3
R5	62-1-1-203		···Trim Pot., SPECTROL/ Equiv.	1
R13 & 22	62-1-1-501		···Trim Pot., SPECTROL/ Equiv.	2
R29	62-1-1-503		···Trim Pot., SPECTROL/ Equiv.	1
R62 & 65	62-1-1-103		···Trim Pot., SPECTROL/ Equiv.	2
3-23-0665		1-23-0624	Spect. Anal. Inverter P.C. Bd.	REF
		1-23-0606	·Spect. Anal. Inverter P.C. Bd.	1
Q1	40321		··Transistor, RCA/Equiv.	1

Dwg. Ref. Symbol	Part No.	IFR Stock No.	Description	Qty Per Assy
3-23-0665		1-23-0624	Spect. Anal. Inverter P.C. Bd.	REF
Q2 & 3	SJE1461		••Transistor, MOTOROLA/ Equiv.	2
Q4	2N2222		••Transistor, MOTOROLA/ Equiv.	1
U1	HP5082-4350		••Opto-Isolator, H-P/ Equiv.	1
CR1 & 2	MR250-5		••Diode, MOTOROLA/Equiv.	1
CR3 thru 6	1N4004		••Diode, DICKSON/Equiv.	4
CR7	1N4148		••Diode, DICKSON/Equiv.	1
CR8	1N5278B		••Zener Diode, MOTOROLA/ Equiv.	1
BR1	VH248		••Bridge Rectifier, VARO/ Equiv.	1
R-6	CM42300		••Pot. (FOCUS), CLARO-STAT/Equiv.	1
R-8	CM42299		••Pot. (INTENSITY) CLAROSTAT/Equiv.	
T-1		2-76-0240	••Transformer, PRECISION WINDING/Equiv.	1
	7.17 Power Monitor Assy. 1-23-0650			
1-23-0651		1-23-0650	Power Monitor Assy.	REF
		2-23-0655	•Power Monitor Block	1
	UG1104A/U		••BNC Connector, AMPHENOL/Equiv.	1
	2058-0000		••SMA Connecotr, AMERICON/Equiv.	1
	FA5C-102W		••Feedthru Cap, 1000pf, ALLEN-BRADLEY/Equiv.	1

Dwg. Ref. Symbol	Part No.	IFR Stock No.	Description	Qty Per Assy
1-23-0651		1-23-0650	Power Monitor Assy. (cont'd)	REF
CR1	MS-7441		••Diode, SOLITRON MICROWAVE/Equiv.	1

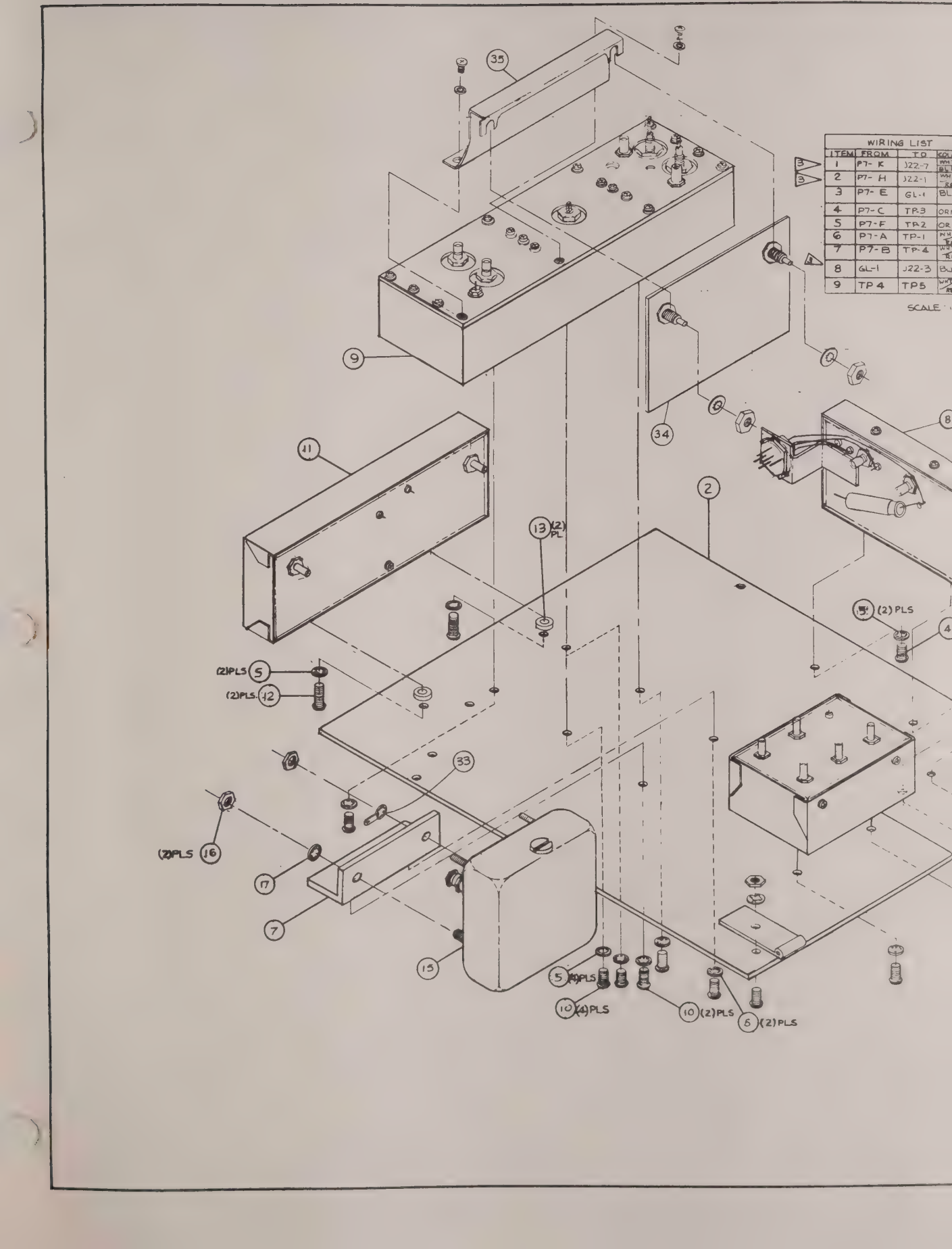
7.18 Coaxial Cables

Dwg. Ref. 4-23-0640 Cable Number	Cable Connections	IFR Stock No.
1.	RF Attenuator to 2nd Mixer & Diode Switch.	1-23-0645-1
2.	120 MHz receiver to 250 kHz IF Monitor, Audio Board.	1-23-0645-2
3.	AM-FM Generator to RF Attenuator	1-23-0645-3
4.	AM-FM Generator to 2nd Mixer and Diode Switch Assy.	1-23-0645-4
5.	Clock Divider to AM-FM Generator	1-23-0645-5
6.	TXCO Output Distribution Amp. to Clock Divider	1-23-0645-6
7.	(See Number 42)	
8.	10 MHz TCXO to J103 (front panel)	1-23-0645-8
9.	1080 MHz Mult. Amp. to 2nd Mixer & Diode Switch Assy.	1-23-0645-9
10.	108 MHz Filter to 1080 MHz Mult. Amp.	1-23-0645-10
11.	TCXO Output Distribution Amp. to 100 MHz Mult. 108 MHz Mixer.	1-23-0645-11
12.	TCXO Output Distribution Amp. to 2nd Mixer & Diode Switch Assy.	1-23-0645-12
14.	1st Mixer to 1200 MHz Filter & T.R. Switch	1-23-0645-14
15.	1200 MHz Filter & T.R. Switch to 2nd Mixer & Diode Switch Assy.	1-23-0645-15
16.	1200 MHz Filter & T.R. Switch to 1200 MHz Amp.	1-23-0645-16
17.	1200 MHz Filter & T.R. Switch to 1200 MHz Amp.	1-23-0645-17
18.	Dual Buffer Amp. to 1st Mixer	1-23-0645-18
19.	V.C.O. Tuner to Tune Summation	1-23-0645-19

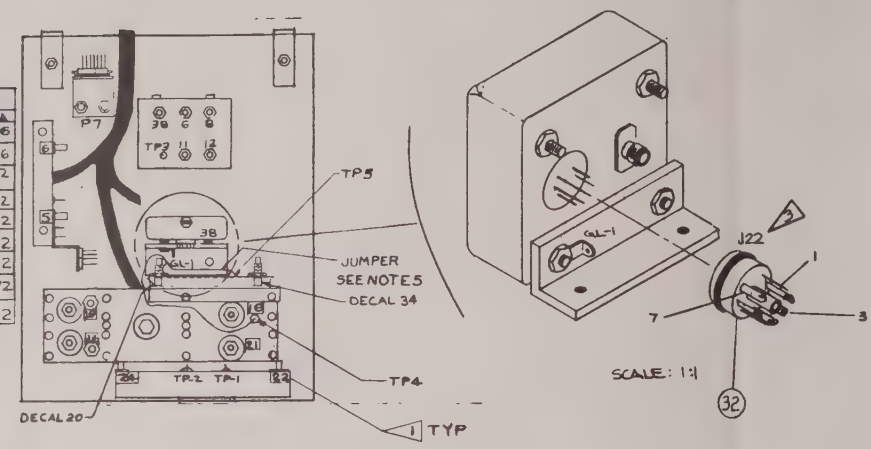
Dwg. Ref. 4-23-0640 Cable Number	Cable Connections	IFR Stock No.
20.	V.C.O. Tuner to AGC System	1-23-0645-20
21.	Dual Buffer Amp. to High Freq. Mult. Mixer	1-23-0645-21
22.	High Freq. Mult, Mixer to Het. Amp. Divide by 2 Prescaler.	1-23-0645-22
23.	Het. Amp. Divide by 2 Prescaler to High Freq. Mult. Mixer	1-23-0645-23
24.	Het. Amp. Divide by 2 Prescaler to High Freq. Phase Locked Loop	1-23-0645-24
25.	High Freq. Phase Locked Loop to V.C.O. Tuner	1-23-0645-25
26.	7.9-8.0 MHz Phase Locked Loop to 100 MHz Mult. 108 Mixer	1-23-0645-26
27.	Antenna Jack (J101) to Static Protect Block	1-23-0645-27
28.	100 MHz Mult. 108 MHz Mixer to 108 MHz Filter Amp.	1-23-0645-28
29.	Change over Relay to 20 dB Pad.	1-23-0645-29
30.	100 MHz Mult. 108 Mixer to 108 MHz Filter	1-23-0645-30
31.	Static Protect Block to Change over Relay	1-23-0645-31
32.	2nd Mixer & Diode Assy. to HF Phase Locked Loop	1-23-0645-32
33.	J108 (Scope in) to Spectrum Analyzer	1-23-0645-33
34.	AGC System to Tune Summ (1200 MHz to 2200 MHz Osc.)	1-23-0645-34
36.	Spectrum Analyzer Module #1 to Module #2 (see Spectrum analyzer Interconnect Dwg 4-23-0656)	1-23-0645-36
37.	Spectrum Analyzer Module #1 to Module #2 (see Dwg. 4-23-0658)	1-23-0645-37

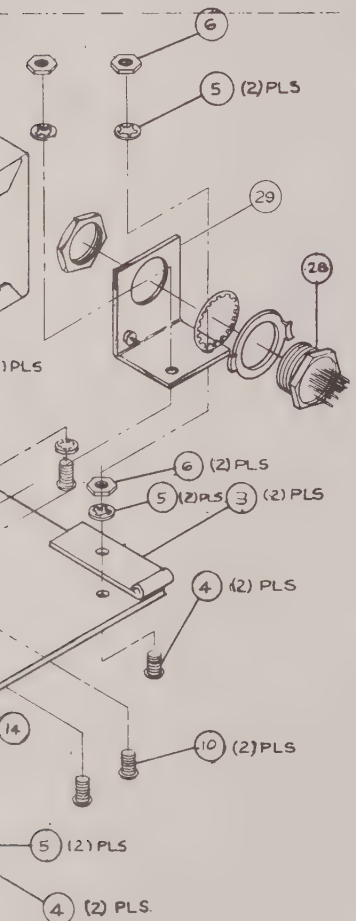
Dwg. Ref. 4-23-0640 Cable Number	Cable Connections	IFR Stock No.
38.	TXCO to TXCO Output Distribution Amp.	1-23-0645-38
39.	Relay (K1) to Change over Relay.	1-23-0645-39
40.	Relay (K1) to 60 dB Pad.	1-23-0645-40
41.	Relay (K1) to Diode Protect & 1st Mixer	1-23-0645-41
42.	2nd Mixer & Diode Switch Assy. to 120 MHz Receiver and Spectrum Analyzer	1-23-0645-42

Dwg. Ref. 4-23-0640 Cable Number	Cable Connections	IFR Stock No.
38.	TXCO to TXCO Output Distribution Amp.	1-23-0645-38
39.	Relay (K1) to Change over Relay.	1-23-0645-39
40.	Relay (K1) to 60 dB Pad.	1-23-0645-40
41.	Relay (K1) to Diode Protect & 1st Mixer	1-23-0645-41
42.	2nd Mixer & Diode Switch Assy. to 120 MHz Receiver and Spectrum Analyzer	1-23-0645-42


WIRING LIST
ITEM FROM TO COL
1 P7-K J22-7 WH
2 P7-H J22-1 BL
3 P7-E GL-1 BL
4 P7-C TP-3 OR
5 P7-F TP-2 OR
6 P7-A TP-1 WH
7 P7-B TP-4 WH BL
8 GL-1 J22-3 BL
9 TP4 TP5 WH RD
SCALE
35
9
34
8
11
2
13 (2) PL
3 (2) PLS
4
(2) PLS 5
(2) PLS 12
33
(2) PLS 16
17
7
15
5 (4) PLS
10 (4) PLS
10 (2) PLS
6 (2) PLS

DATE	REV	CHANGE	APP'D
7/16/77	B	INCORP ECN # 2282	
7/26/77	C	INCORP ECN # 2411 & 2420	
8-4-77	D	INC ECN 2647	





1. IDENTIFY RF CONNECTORS WITH "BRADY"/EQUIV # TMM-0-49 MARKER APPROX. AS SHOWN.

2. ATTACH COAX CABLES (ITEMS 18-27, 30, 31) TO APPROPRIATE POSITION AND ROUTE APPROXIMATELY AS SHOWN (SEE SHADED AREA). NEATLY BUNDLE LOOSE CABLES TOGETHER AND LEAVE HANG.

3. PLACE HEATSHRINK TUBING OVER J22 TERMINALS 1, 3 & 7

4. REMOVE MOUNTING BRKT. PRIOR TO INSTALLING

5. JUMPER WIRE BETWEEN TP4 & TP5 MUST BE ROUTED AS SHOWN.

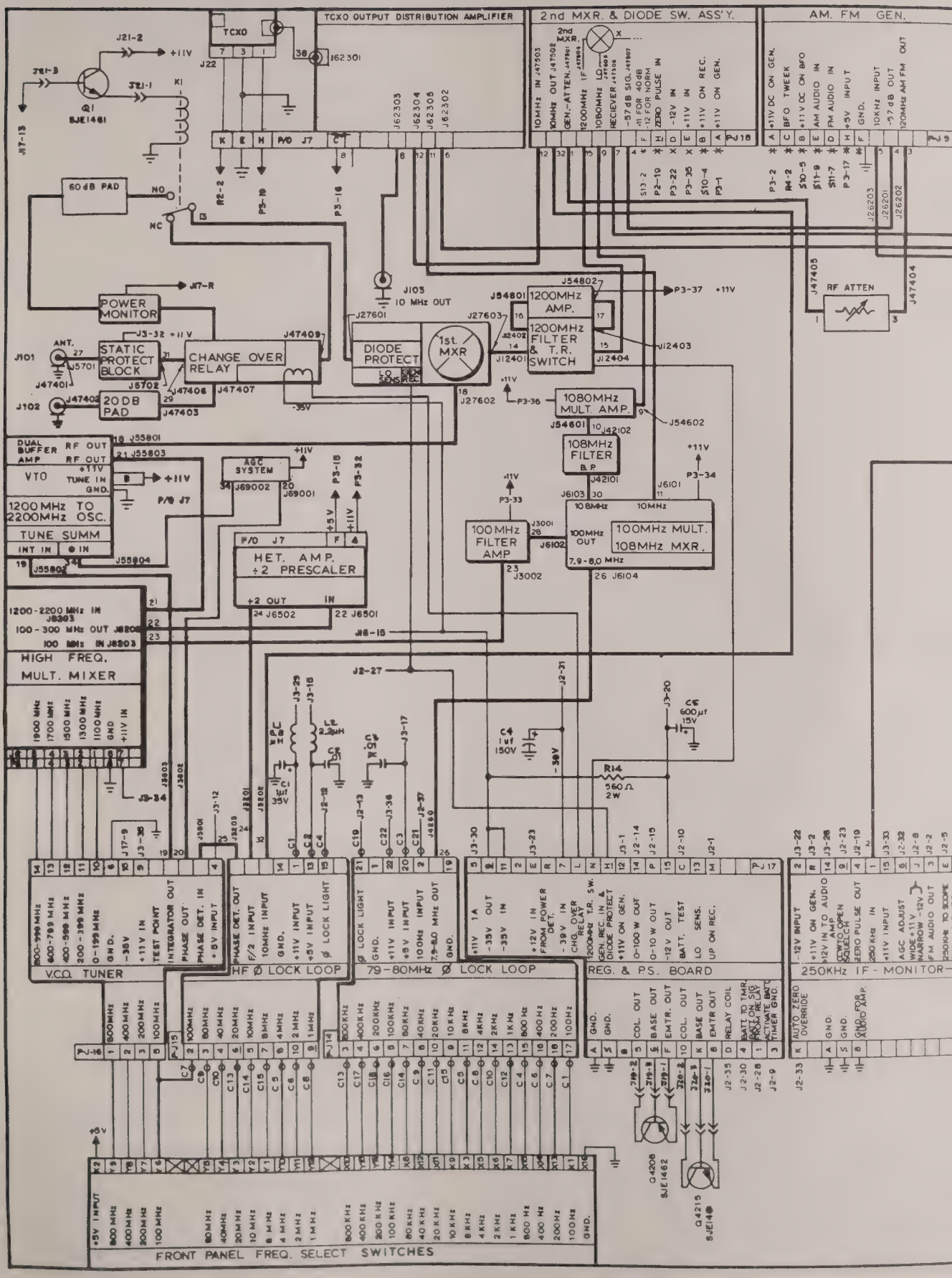
ITEM	REQ'D	PART NO	DESCRIPTION
35	1	1-23-0624	AGC SYSTEM PC BD MTG BRKT.
34	1	1-23-0686	AGC SYSTEM PC BOARD ASSY
33	1	4411-6	"HH SMITH"/EQUIV #6 GROUND LUG
32	1	8570	"EBY"/EQUIV (7) PIN TUBE SOCKET
31	1	-26	
30	1	949-0446-M	FLEXIBLE RF CABLE
29	1	1-23-0410	CONN. MOUNTING BRACKET
28	1	MSPLRN	"WINCHESTER"/EQUIV 9 POS MALE CONN
27		-24	
26		-22	
25		-21	
24		-20	
23		-18	
22		-12	
21		-11	
20		-8	
19		-6	
18	1	949-0443-3	FLEXIBLE RF CABLE
17	1	#6	INT. TOOTH LOCKWASHER
16	2	#6-32	LARGE PATTERN HEX NUT
15	1	252-3197	"VECTRON"/EQUIV TCXO. 10 MHz
14	1	1-23-0620	TCXO-OUTPUT DIST ASSEMBLY
13	2	2-56-0001-61	SPACER
12	2	#4-40 x 7/16	PBHMS
11	1	1-23-0225	HETERODYNE AMP & PRESCALER
10	8	#4-40 x 1/4	PBHMS
9	1	1-23-0560	1200-2200 MHz OSC. ASSY
8	1	1-23-0217	CLOCK DIVIDER ASSEMBLY
7	1	1-23-0648	MOUNTING BRACKET
6	4	#4-40	LARGE PATTERN HEX NUT
5	16	#4	INT. TOOTH LOCKWASHER
4	6	M4-40 x 1/8	PBHMS
3	2	1-23-0170	HINGE
2	1	2-23-0606	UPPER FLOOR MTG. PLATE
1	1	4-23-0644	UPPER FLOOR ASSEMBLY

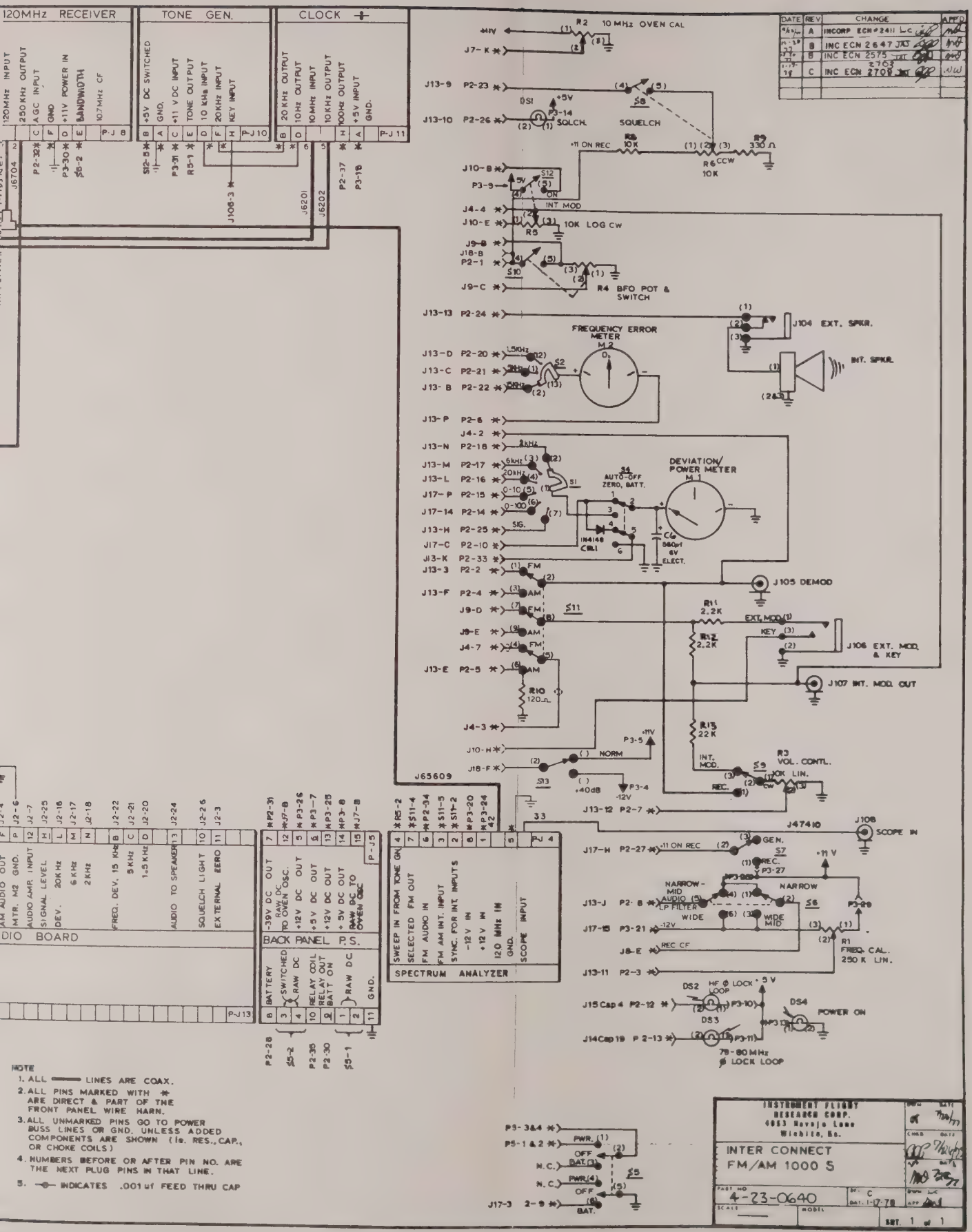
LIST OF MATERIALS

TOLERANCES	UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY AFTER FINISH DECIMALS .xx = ± .010 .xxx = ± .005 ANGLES ± 1/2° FRACTIONS ± 1/64 SURFACE ROUGHNESS 125 REMOVE ALL BURRS
DRAWN	T T 5-11-77
CHECKED	6/16/77
APPROVED	7/26/77
MATERIAL	
FINISH	
- IFR INC - WICHITA, KANSAS	
TITLE	UPPER FLOOR ASSEMBLY FM/AM 1000 S
SIZE	D
PART NUMBER	4-23-0644
REV	D
SCALE	1:1
SHEET	1 OF 1

1-23-0641 | NEXT ASSY | QTY | APPLICATION | MODEL | LOCAL #

Figure 6-2 (S)

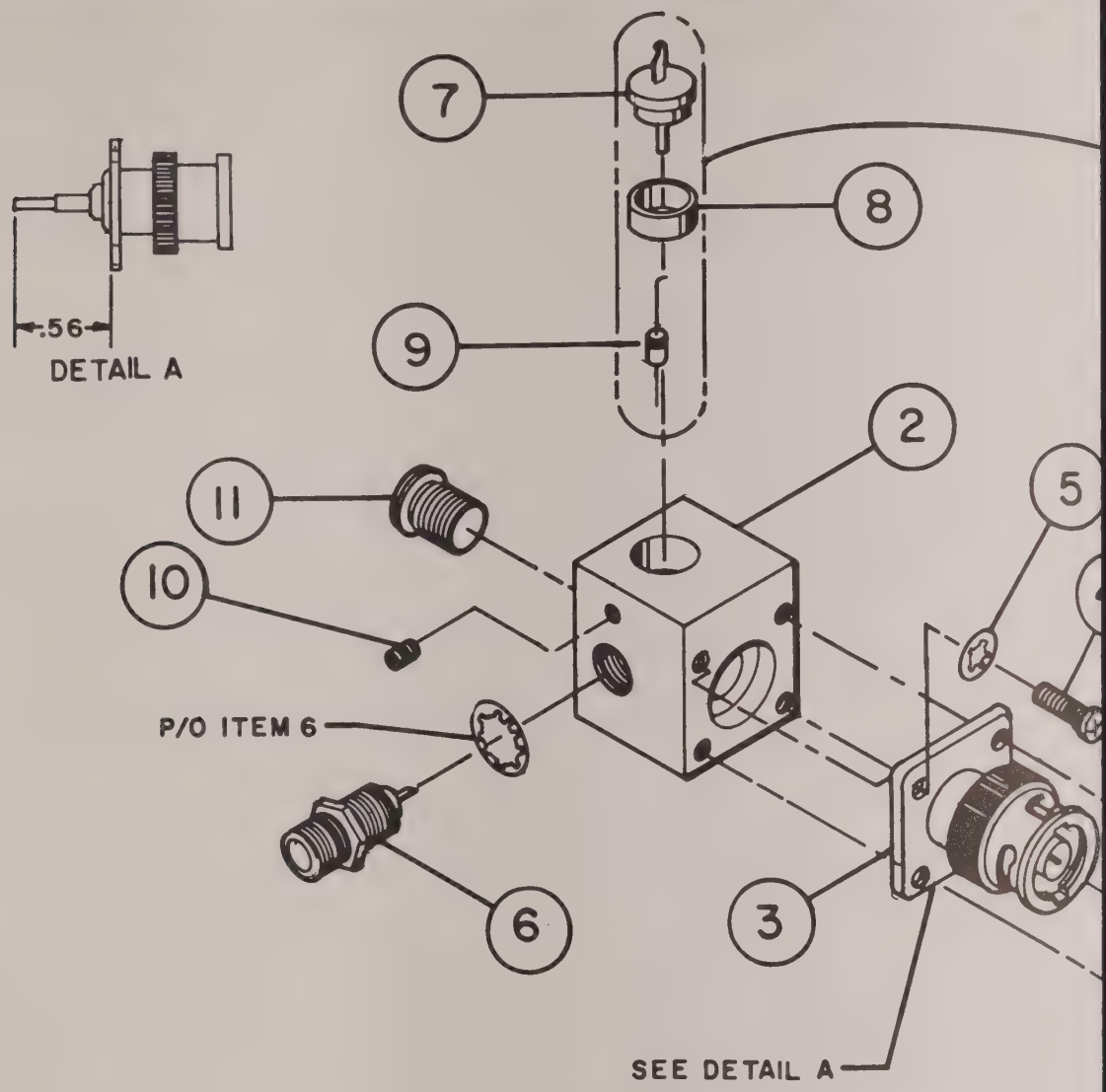

TCXO OUTPUT DISTRIBUTION AMPLIFIER
2nd MXR. & DIODE SW. ASS'Y.
AM. FM GEN.
TCXO
60dB PAD
POWER MONITOR
STATIC PROTECT BLOCK
CHANGE OVER RELAY
20 DB PAD
DIODE PROTECT
1st. MXR
1200MHz AMP.
1200MHz FILTER & T.R. SWITCH
RF ATTEN
1080MHz MULT. AMP.
108MHz FILTER B.P.
AGC SYSTEM
100MHz FILTER AMP
100MHz MULT. 108MHz MXR.
HET. AMP. ÷2 PRESCALER
DUAL BUFFER AMP
VTO
1200MHz TO 2200MHz OSC.
TUNE SUMM
HIGH FREQ. MULT. MIXER
V.C.O. TUNER
HF Ø LOCK LOOP
79-80MHz Ø LOCK LOOP
REG. & P.S. BOARD
250KHz IF - MONITOR
FRONT PANEL FREQ. SELECT SWITCHES



NOTE

1. ALL ——— LINES ARE COAX.
2. ALL PINS MARKED WITH * ARE DIRECT & PART OF THE FRONT PANEL WIRE HARN.
3. ALL UNMARKED PINS GO TO POWER BUSS LINES OR GND. UNLESS ADDED COMPONENTS ARE SHOWN (Ie. RES., CAP., OR CHOKE COILS)
4. NUMBERS BEFORE OR AFTER PIN NO. ARE THE NEXT PLUG PINS IN THAT LINE.
5. —o— INDICATES .001 uf FEED THRU CAP

Figure 6-3 (S)



4. INSTALL ITEM 11 PLUG IN REAR OF BLOCK (ITEM 2).

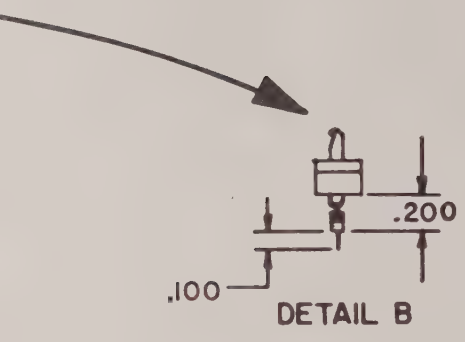
3. INSTALL ITEM 6 CONNECTOR AND MAKE SOLDER CONNECTION OF BOTH CONNECTORS AND DIODE LEAD THRU HOLE AT REAR OF BLOCK (ITEM 2).

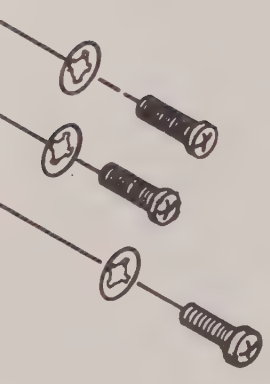
2. ASSEMBLE ITEMS 7,8,& 9 PER DETAIL "B". INSERT INTO BLOCK AND SECURE WITH ITEM 10 SET SCREW.

1. SOLDER BUSS-WIRE TO ITEM 3 CONNECTOR PER DETAIL "A" AND ASSEMBLE TO ITEM 2 BLOCK AS SHOWN.

ASSEMBLY PROCEDURES:

DATE	REV	CHANGE	APP'D



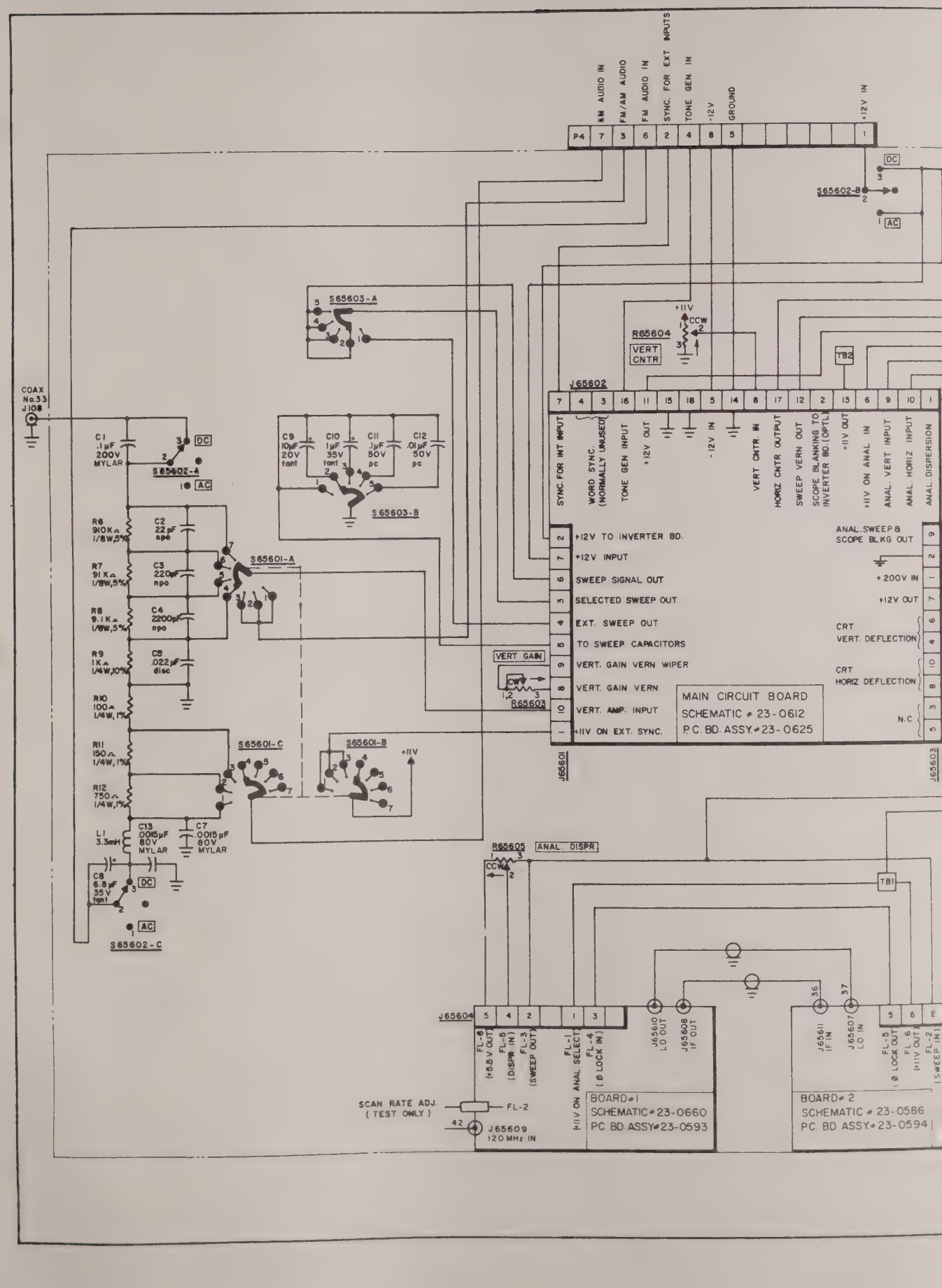


ITEM	REQ'D	PART NO.	DESCRIPTION
11	1	1-14-0273	PLUG
10	1	#4-40x3/32	SOCKET HEAD SET SCREW
9	1	MS-7441	"SOLITRON MICROWAVE"/EQUIV DIODE
8	1	2-76-0001-18	BUSHING
7	1	FA5C-102W	"ALLEN-BRADLEY"/EQUIV. 1000pf F-T CAP.
6	1	2058-0000	"AMERICON"/EQUIV. SMA CONNECTOR
5	4	#4	INT. TOOTH LOCKWASHER
4	4	#4-40 x 5/16	PBHMS
3	1	UG1104-A/U	"AMPHENOL"/EQUIV BNC CONNECTOR
2	1	2-23-0655	POWER MONITOR BLOCK
1	1	2-23-0650	POWER MONITOR ASSEMBLY

LIST OF MATERIALS

23-0650	1	FM/AN 1000B	TOLERANCES UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY AFTER FINISH DECIMALS .xx = ± .010 .xxx = ± .005 ANGLES ± 1/2° FRACTIONS ± 1/64 SURFACE ROUGHNESS 125 REMOVE ALL BURRS	DRAWN TJT DATE 7/7/77 CHECKED DATE 7/22/77 APPROVED DATE 7/25/77	- IFR INC - WICHITA, KANSAS
NEXT ASS'Y	QTY	MODEL			TITLE POWER MONITOR ASSEMBLY
APPLICATION			MATERIAL	SIZE 2	PART NUMBER 23-0650 REV —
			FINISH	SCALE 1:1 WEIGHT —	SHEET 1 OF 1

Figure 6-20 (S)


P4
AM AUDIO IN
FM/AM AUDIO
FM AUDIO IN
SYNC. FOR EXT INPUTS
TONE GEN. IN
-12V
GROUND
+12V IN
DC
AC
S65602-B
S65603-A
+11V
CCW
R65604
VERT CNTR
T82
J65602
SYNC. FOR INT INPUT
WORD SYNC. (NORMALLY UNUSED)
TONE GEN INPUT
+12V OUT
-12V IN
VERT CNTR. IN
HORIZ CNTR OUTPUT
SWEEP VERN OUT
SCOPE BLANKING TO INVERTER BD. (OPTL)
+11V OUT
+11V ON ANAL IN
ANAL. VERT INPUT
ANAL. HORIZ INPUT
ANAL DISPERSION
+12V TO INVERTER BD.
+12V INPUT
SWEEP SIGNAL OUT
SELECTED SWEEP OUT
EXT. SWEEP OUT
TO SWEEP CAPACITORS
VERT. GAIN VERN WIPER
VERT. GAIN VERN
VERT. AMP. INPUT
+11V ON EXT. SYNC.
ANAL. SWEEP & SCOPE BLKG OUT
+200V IN
+12V OUT
CRT VERT. DEFLECTION
CRT HORIZ DEFLECTION
N.C
MAIN CIRCUIT BOARD
SCHEMATIC # 23-0612
P.C. BD. ASSY.# 23-0625
J65601
J65603
VERT GAIN
R65603
COAX No.33 J108
C1 .1µF 200V MYLAR
S65602-A
C9 10µF 20V tant
C10 1µF 35V tant
C11 .1µF 50V pc
C12 .01µF 50V pc
S65603-B
R6 910KΩ 1/8W,5%
C2 22pF npo
R7 91KΩ 1/8W,5%
C3 220pF npo
S65601-A
R8 9.1KΩ 1/8W,5%
C4 2200pF npo
R9 1KΩ 1/4W,10%
C5 .022µF disc
R10 100Ω 1/4W,1%
R11 150Ω 1/4W,1%
R12 750Ω 1/4W,1%
S65601-C
S65601-B
+11V
L1 3.3mH
C13 .0015µF 80V MYLAR
C7 .0015µF 80V MYLAR
C8 6.8µF 35V tant
S65602-C
R65605
ANAL. DISPR
T81
J65604
FL-6 (+5.5 V OUT)
FL-5 (DISPR IN)
FL-3 (SWEEP OUT)
FL-1 (+11V ON ANAL SELECT)
FL-4 (Ø LOCK IN)
J65610 LO OUT
J65608 IF OUT
J65611 IF IN
J65607 LO IN
FL-5 (Ø LOCK OUT)
FL-6 (+11V OUT)
FL-2 (SWEEP IN)
SCAN RATE ADJ. (TEST ONLY)
FL-2
J65609 120 MHz IN
BOARD # 1
SCHEMATIC # 23-0660
PC BD ASSY # 23-0593
BOARD # 2
SCHEMATIC # 23-0586
PC. BD ASSY.# 23-0594

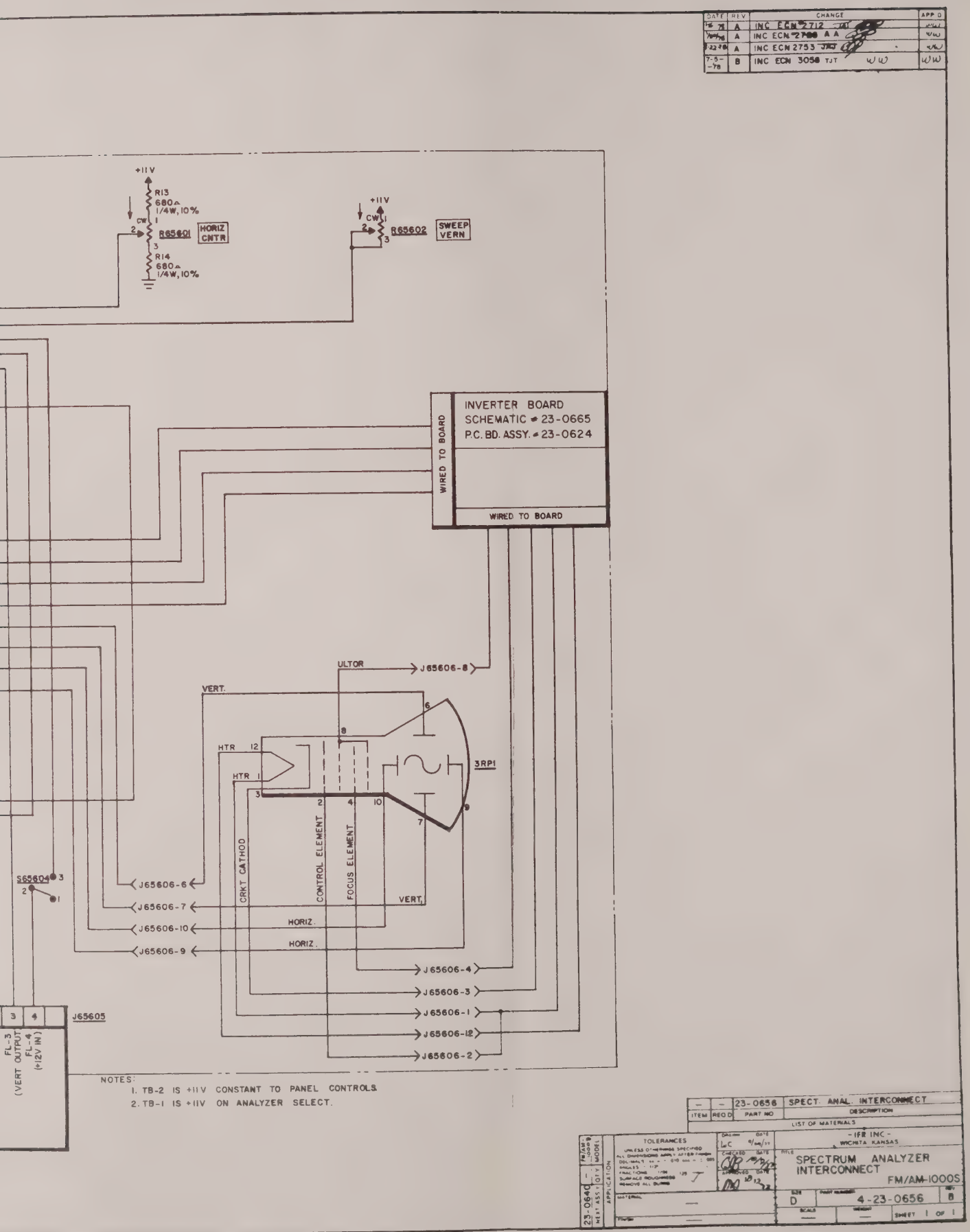
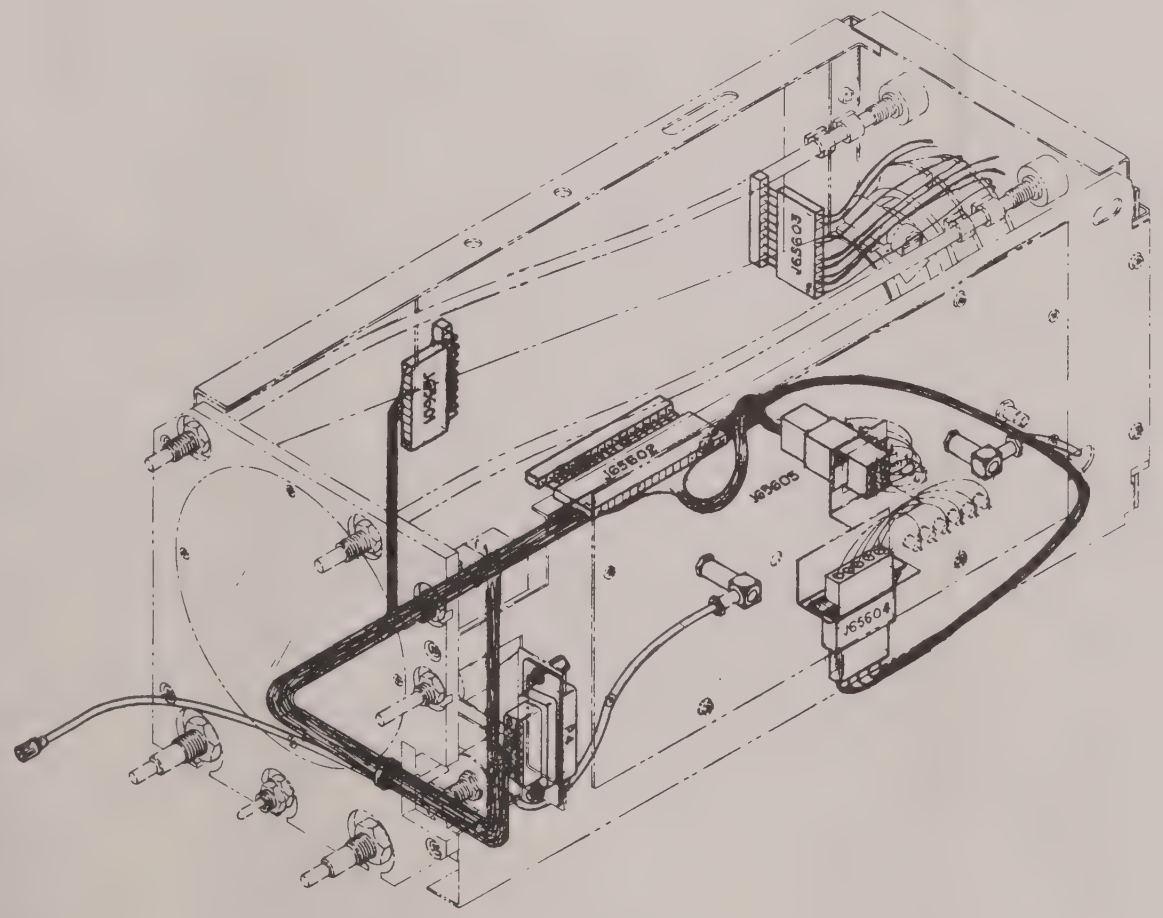

DATE | REV | CHANGE | APP'D
A | INC ECN 2712
A | INC ECN 2755
B | INC ECN 3058 TJT
+11V
R13 680Ω 1/4W, 10%
R65601
HORIZ CNTR
R14 680Ω 1/4W, 10%
+11V
R65602
SWEEP VERN
INVERTER BOARD
SCHEMATIC # 23-0665
P.C. BD. ASSY. # 23-0624
WIRED TO BOARD
WIRED TO BOARD
ULTOR
J65606-8
VERT.
HTR 12
HTR 1
3RP1
CRT CATHOD
CONTROL ELEMENT
FOCUS ELEMENT
S65604
J65606-6
J65606-7
VERT.
J65606-10
HORIZ.
J65606-9
HORIZ.
J65606-4
J65606-3
J65606-1
J65606-12
J65606-2
J65605
FL-3 (VERT OUTPUT)
FL-4 (+12V IN)
NOTES:
1. TB-2 IS +11V CONSTANT TO PANEL CONTROLS.
2. TB-1 IS +11V ON ANALYZER SELECT.
23-0656 SPECT. ANAL. INTERCONNECT
ITEM | REQ'D | PART NO | DESCRIPTION
LIST OF MATERIALS
- IFR INC - WICHITA KANSAS
SPECTRUM ANALYZER INTERCONNECT
FM/AM-1000S
4-23-0656
23-0640

Figure 6-81 (S)

DATE	REV	CHANGE	APP'D
[illegible]	B	INCORP ECN # 2304 & 2307	[illegible]
[illegible]	C	INCORP ECNs 2881 & 2913	[illegible]
[illegible]	D	INCORP ECN #2994	[illegible]



NOTES:

1. CONNECT ALL CONNECTORS OF FRONT PLATE ASSY. IN POSITION SHOWN.
2. SNUG TIGHTEN ONLY. EXCESSIVE TORQUE WILL FRACTURE GRATICULE.

ITEM	QTY	PART NO	DESCRIPTION
28	4	#4-40 x 5/64	SOCKET SETVE SET SCREW
27	1	6680	SPACER 7/8 DIA. HOSE CLAMP
26	4	85-0808	CATCH RING
25	1	25-0237-37	
24	1	25-0237-36	FLEXIBLE COAX ASSY
23	2	#4-40	SMALL PATTERN HEX NUT
22	8	78-060-1	SHELL WAY
21	1	23-0633	MODULE #2 ASSY
20	1	23-0632	MODULE #1 ASSY.
19	18	#4-40 x 1/16	PHMS
18	1	23-0140	REAR COVER
17	4	#4	FLAT WASHER
16	1	25-0635	INSULATOR
15	1	23-0628	SPECT ANAL MAIN PC BD ASSY
14	2	25-0608	PLUG DRAFT
13	27	#4	INT TOOTH LOCKWASHER
12	8	#4-40 x 1/4	PHMS
11	1	23-0624	SPECT ANAL INVERTER PC BD ASSY
10	1	25-0631	SPECT ANAL SIDE FRAME (LEFT)
9	4	#4-40 x 1/4	PFHMS
8	1	25-0632	SPECT ANAL SIDE FRAME (RIGHT)
7	1	25-0634	CRT SHIELD
6	1	58P-1	BEAM/FOCUS CRT
5	2	79-0180	[illegible]
4	4	#2-56 x 3/16	PFHMS
3	1	25-0617	GRATICULE
2	1	25-0625	FRONT PLATE ASSY
1	1	23-0629	SPECT ANAL FINAL ASSY.

LIST OF MATERIALS

- HP INC -
WICHITA, KANSAS

TOLERANCES UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY AFTER FINISH DECIMALS 1 PL ± .1 2 PL ± .05 3 PL ± .02 ANGLES ± 1/2° FRACTIONS ± 1/64 SURFACE ROUGHNESS REMOVE ALL BURRS = 7

DRAWN LC 10-4-77
CHECKED
APPROVED

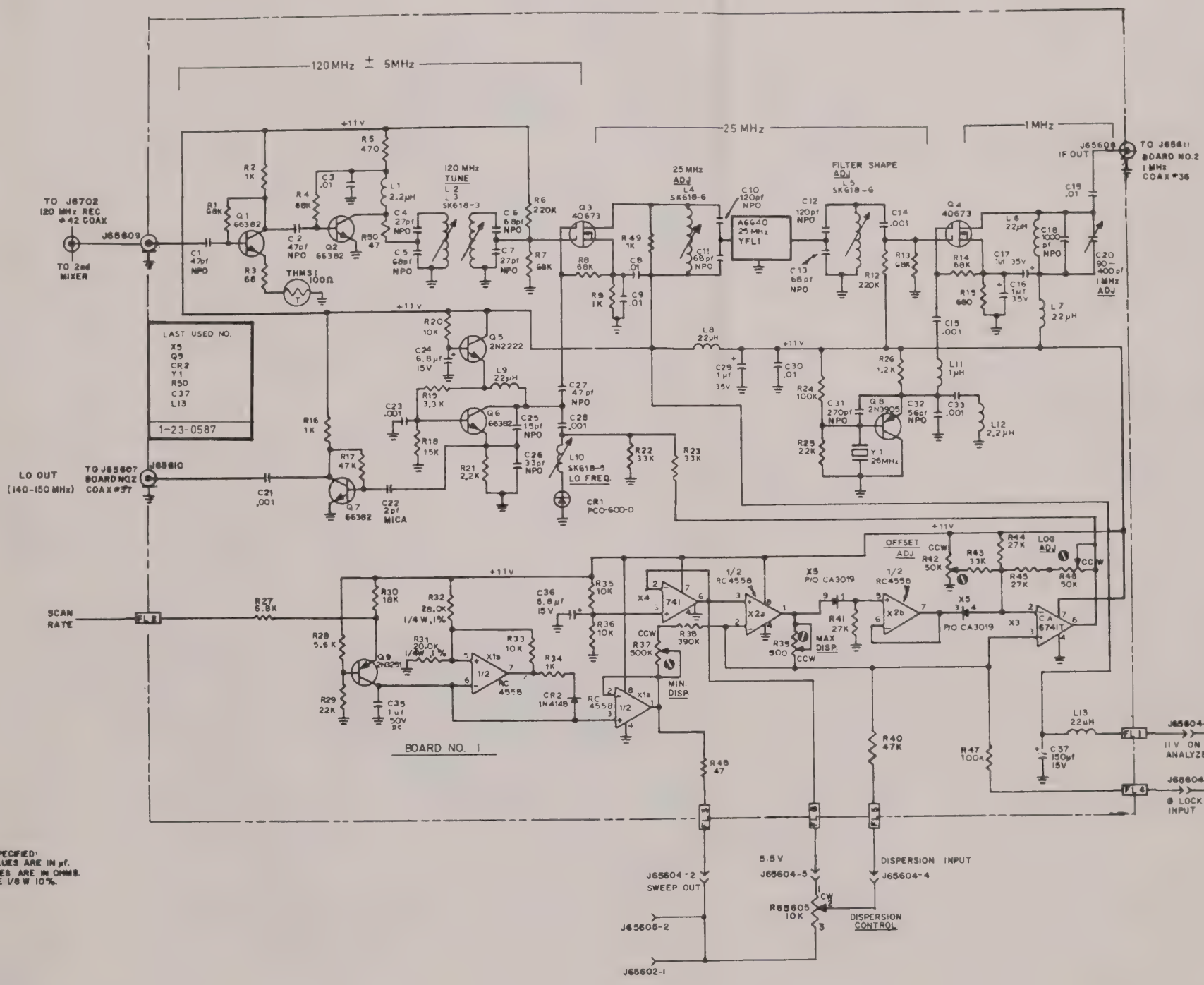
SPECTRUM ANALYZER
FINAL ASSY.
FM/AM-10008

SIZE D
4-23-0629
REV D

SCALE 1/4
SHEET 1 OF 2

Figure 6-89 (S)

REV	ZONE	DESCRIPTION	APPD
A		INCORP ECN # 2906 WC	
B		NC FCN 2838 JWJ	
C		NC ECN # 2751, 2826	
D		NC ECN 3058 TJT	



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   A. ALL CAPACITOR VALUES ARE IN μf.
   B. ALL RESISTOR VALUES ARE IN OHMS.
   C. ALL RESISTORS ARE 1/8 W 10%.

ITEM	REQ'D	PART NO	DESCRIPTION

LIST OF MATERIALS

TOLERANCES

TJT 6-15-77

- IFR INC. - WICHITA, KANSAS

SPECTRUM ANALYZER BOARD NO.1 SCHEMATIC

SIZE D | PART NUMBER 4-23-0660 | REV D

SHEET 1 OF 1

Figure 6-90 (S)

DATE	REV.	CHANGE	APP'D
2 Mar 76	A	INCORP ECN-2230 AA	
4 Jun 76	B	INCORP ECN-2360 LC	
16 Jun 76	C	INCORP ECN-2471 LC	
8/27/76	D	INC ECN's 2859, 2753, [illegible]	
7 Jan 77	E	INC ECN 3058 T.T.	

Figure 6-91 (S)

DATE	REV	CHANGE	APP'D
	A		
	B		
	C		
	D		
12-2		NC ECN 3058 TT	

25 MHz FILTER IN
120 MHz TUNE
LOG ADJ
MAX DISP
LO FREQ
MIN DISP
OFFSET ADJ
FILTER SHAPE ADJUST
SEE REF VIEW A
SEE REF VIEW B
LO OUT
120 MHz REC
IF OUT (1 MHz)
1 MHz PEAK
J65608
J65609
J65610
YFL1
A
VIEW B
SOLDER
THMS1
R2
R3

+11V SIGNAL SELECT SCAN RATE
SWEEP OUT
PHASELOCK IN
DISP. IN
+5.5V OUT
.65
1 2 3 4 5 6

COAX #42
J65609 120MHz IN
(115-125 MHz)
SK618-3
COAX #37
J65610 LO OUT (140 - 150 MHz)
SK618-6
COAX # 36
J65608 IF OUT (1 MHz)
AEP EQUIV.
17-0204-000
SK618-6
SK618-5
1-23-0123-2

5 1-23-0627
5 1-23-0123-2
5 A6640
5 1-23-0123-1
SEE REF VIEW A
SEE REF VIEW B

25 MHz FILTER
HEATH DYNAMICS
A6640

90-400 pf
ELMENCO NO. 429
33K
SK618-5
1-23-0123-2 /5

CUT PATH
R50
47Ω
VIEW A
(LOOKING THRU BOARD)

NOTES:

1. ALL RESISTORS ARE 1/8 W., 10 % TOLERANCE EXCEPT AS NOTED.
2. ALL CAPACITOR VALUES ARE IN μF EXCEPT AS NOTED.
3. COMPONENT LEADS MAY EXTEND .04 TO .06 BEYOND BOTTOM OF BOARD AFTER SOLDERING.
4. MAXIMUM HEIGHT OF COMPONENTS TO BE .65 FROM COMPONENT SIDE OF BOARD.
5. ALL RF SHIELDS TO BE COMPLETELY SOLDERED, ALL SIDES.
6. ALL JUMPERS TO BE AWG 24
7. REF DWG: SCHEMATIC 4-23-0660

∗ (ASTERISK) DENOTES ± 1% RESISTOR TOLERANCE 1/4 W

ITEM	REQ'D	PART NO.	DESCRIPTION

LIST OF MATERIALS

TOLERANCES
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS APPLY AFTER FINISH
DECIMALS .XX = ± .010 .XXX = ± .005
ANGLES = 1/2°
FRACTIONS = 1/64
SURFACE ROUGHNESS 125
REMOVE ALL BURRS

DRAWN 4/20/77
CHECKED 5-4-77
APPROVED 5-5-77

- IFR INC -
WICHITA KANSAS

TITLE
SPECTRUM ANALYZER
PC BD ASSY
BD NO. 1

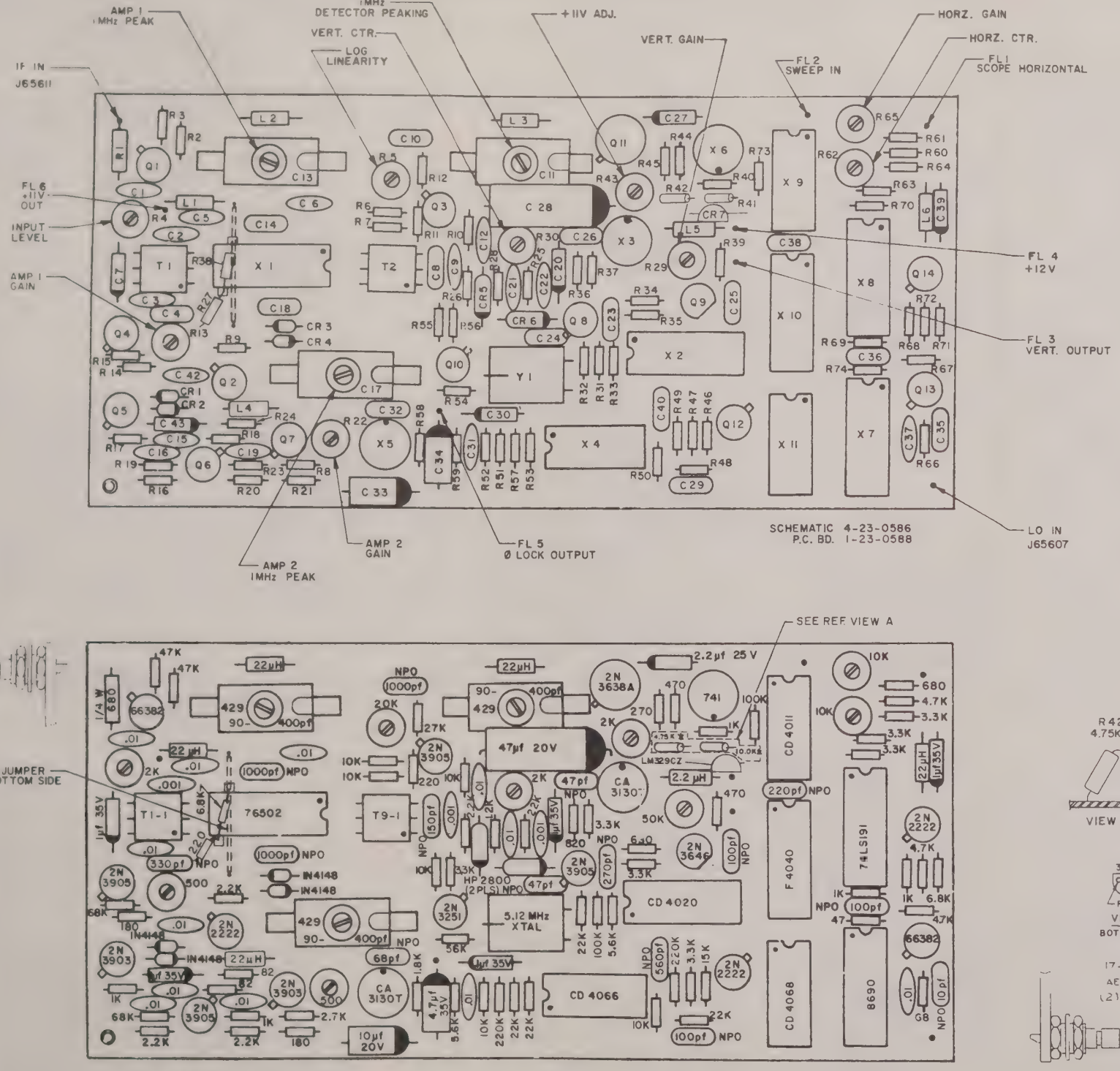
MATERIAL
FINISH

SIZE C | PART NUMBER 3-23-0593 | REV C-2
SCALE 2/1 | WEIGHT | SHEET 1 OF 1

NEXT ASSY 3-23-0626 | QTY 1 | MODEL | APPLICATION

Figure 6-92 (S)

DATE	REV	CHANGE	APP'D
2/12/77	A	UPDATE REV LETTER AA	
[illegible]	B	INCORP ECN # [illegible]	
[illegible]	C	INCORP ECN # 1388	
[illegible]	D	INCORP ECN # 2471	
[illegible]	E	INCORP. ECN # 2558 AB	
[illegible]	E-1	NC ECN 2707	



NOTES:

1. ALL RESISTORS ARE 1/8 W., 10% TOLERANCE EXCEPT AS NOTED.
2. ALL CAPACITOR VALUES ARE IN μF EXCEPT AS NOTED.
3. COMPONENT LEADS MAY EXTEND .04 TO .06 BEYOND BOTTOM OF BOARD AFTER SOLDERING.
4. MAXIMUM HEIGHT OF COMPONENTS TO BE .35 FROM COMPONENT SIDE OF BOARD.
5. RESISTORS MARKED WITH ASTERISK (*) ARE 1/4 W, 1%.

ITEM	REQ'D	PART NO	DESCRIPTION
1	1	1-23-0594	SPECTRUM ANALYZER BD. #2 ASS'Y.

LIST OF MATERIALS

TOLERANCES	UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY AFTER FINISH DECIMALS .XX ± .010 .XXX ± .005 ANGLES ± 1/2° FRACTIONS ± 1/64 SURFACE ROUGHNESS 125 REMOVE ALL BURRS
DRAWN	DATE 7/14/77
CHECKED	DATE
APPROVED	DATE 8-5-77
MATERIAL	
FINISH	
NEXT ASSY	1-23-0633
QTY	1
MODEL	1005
APPLICATION	
TITLE	SPECTRUM ANALYZER BOARD #2 ASSEMBLY
SIZE	C
PART NUMBER	3-23-0594
REV.	
SCALE	2:1
WEIGHT	
SHEET	1 OF 1

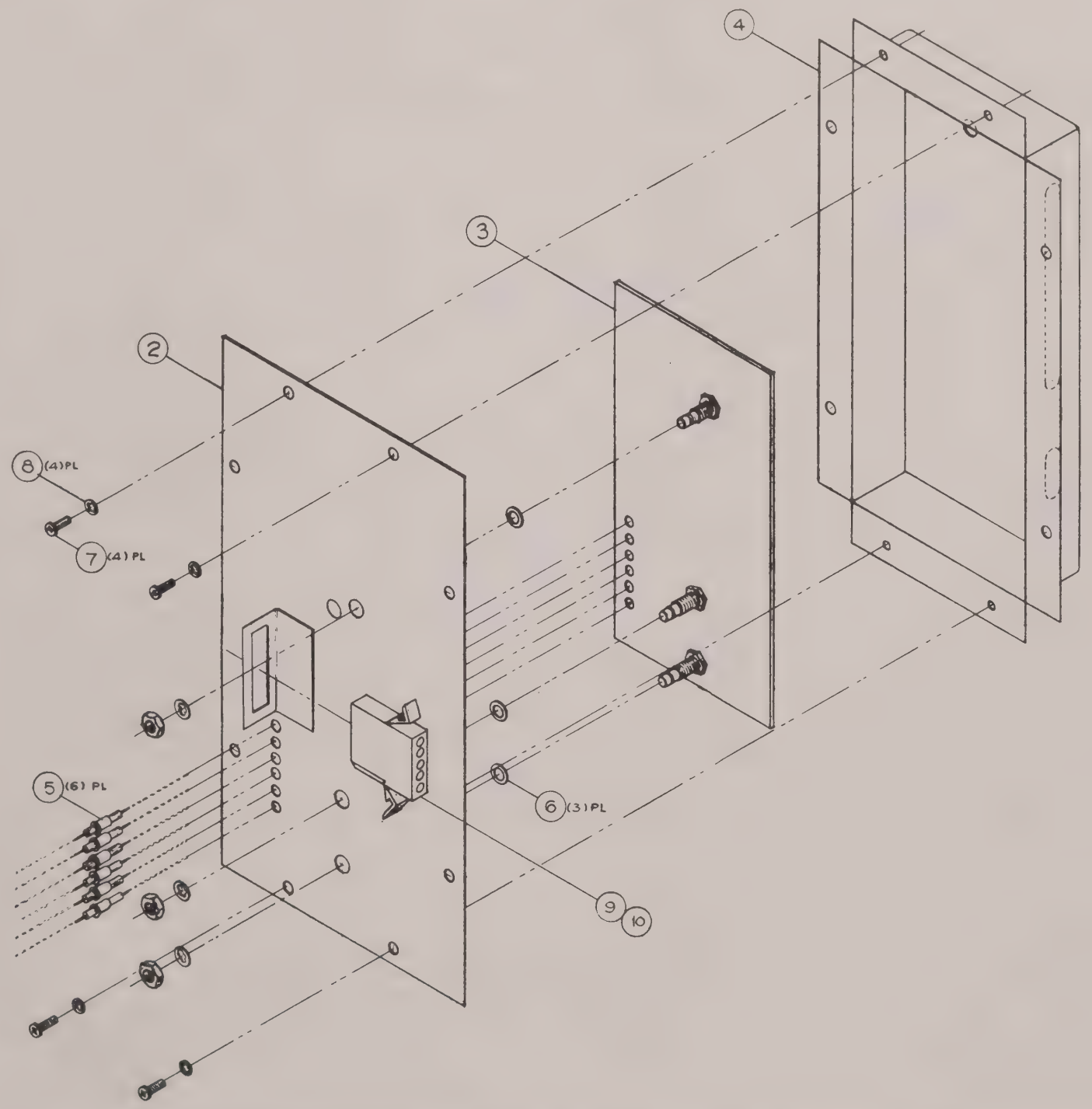
– IFR INC –
WICHITA, KANSAS

Figure 6-93 (S)

DATE	REV	CHANGE	APP'D
7/14/77	A	INCORP ECR # 2347 LRC	

NOTES:

1. SOLDER ITEMS 2 & 5 (COVER & FEEDTHRU FILTERS)
2. TRIM ALL FILTER LEADS TO APPROX. .15 FROM BODY OF FILTER.
3. REFER SHT. 2 OF 2 FOR ASSY. OF ITEM 2 (COVER) & ITEM 3 (SPECT. ANAL. BOARD # 1 ASSY) WITH SPECIFY WIRE LENGTHS.



ITEM	REQ'D	PART NO	DESCRIPTION
10	5	02-06-1132	'MOLEX'/EQUIV FEMALE CRIMP PIN
9	1	03-06-1055	'MOLEX'/EQUIV (5) PIN FEMALE CONN.
8	4	#4	INT TOOTH LOCKWASHER
7	4	#4-40 x 3/16	PBHMS
6	3	76-0001-54	SPACER
5	6	51-713-002	'SPECTRUM CONTROLS'/EQUIV FEEDTHRU FILTER
4	1	23-0621	ENCLOSURE
3	1	23-0593	SPECT ANAL BD # 1 ASSY.
2	1	23-0628	COVER
1	1	23-0632	SPECT ANAL MODULE # 1 ASSY

NOT SHOWN

LIST OF MATERIALS

FM/AM 1000S	MODEL
1	QTY
23-0626	NEXT ASSY
	APPLICATION

TOLERANCES
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS APPLY AFTER FINISH
DECIMALS: .xx ± .010 .xxx ± .005
ANGLES: ± 1/2°
FRACTIONS: ± 1/64
SURFACE ROUGHNESS 125 ✓
REMOVE ALL BURRS

DRAWN LrC 7-18-77
CHECKED
ENGINEER
APPROVED

MATERIAL SEE L/M
FINISH —

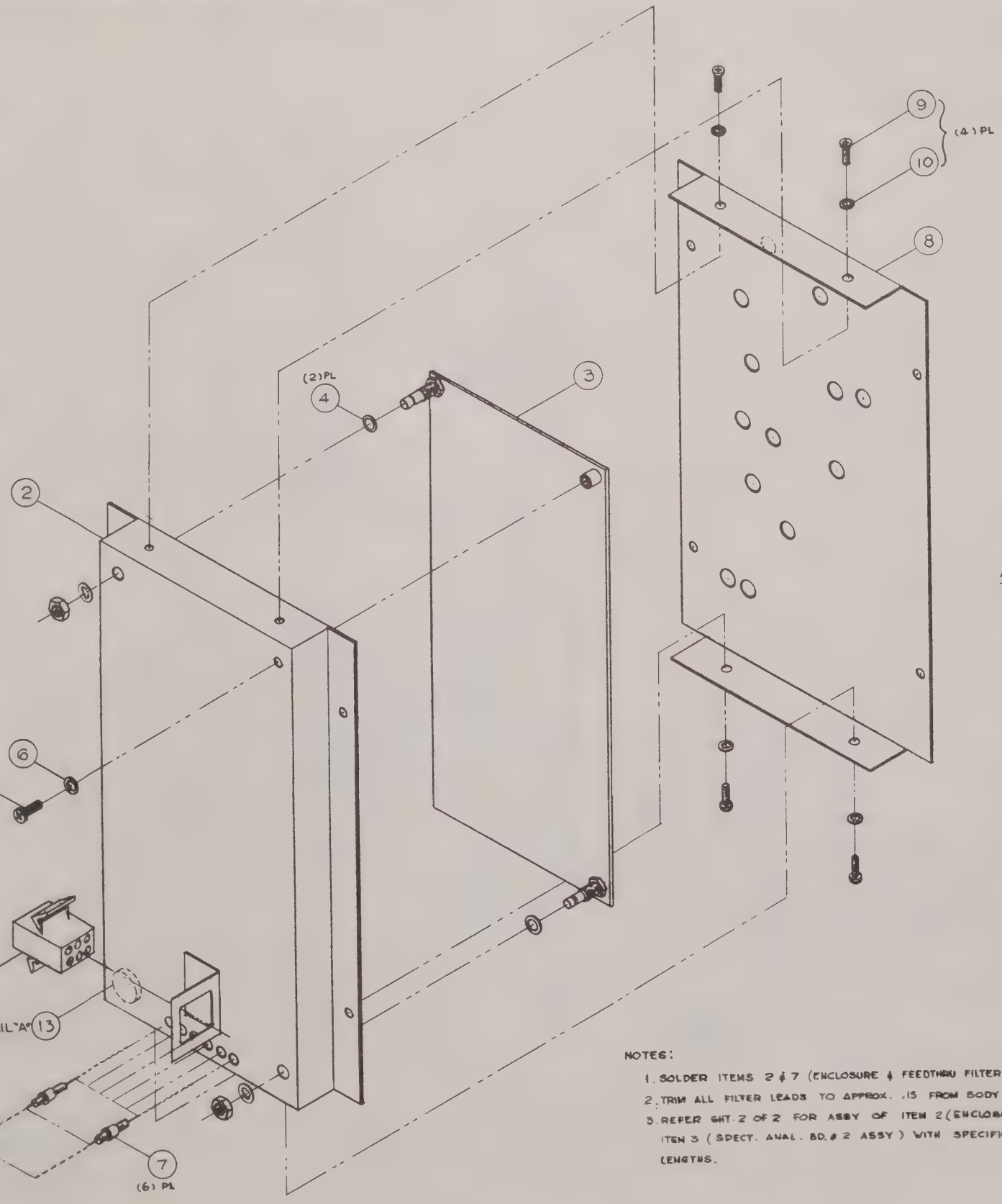
- IFR INC -
WICHITA, KANSAS

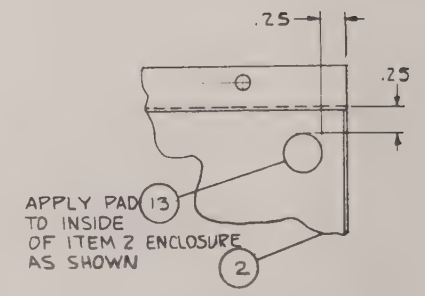
TITLE
SPECTRUM ANALYZER
MODULE # 1 ASSY.
FM/AM - 1000S

SIZE C | PART NUMBER 3-23-0632 | REV A
SCALE NONE | WEIGHT — | SHEET 1 OF 2

Figure 6-94 (S)

DATE	REV	CHANGE	APP'D
4/11/77	A	INCORP ECN # 2391 LC	
7/6/77	B	INC ENG # 2630	
11/19/78	C	INC. ECN # 2721 AA	





DETAIL "A"

NOTES:

1. SOLDER ITEMS 2 & 7 (ENCLOSURE & FEEDTHRU FILTERS)
2. TRIM ALL FILTER LEADS TO APPROX. .15 FROM BODY OF FILTER
3. REFER GHT. 2 OF 2 FOR ASSY OF ITEM 2 (ENCLOSURE) & ITEM 3 (SPECT. ANAL. BD. # 2 ASSY) WITH SPECIFIC WIRE LENGTHS.

ITEM	REQ'D	PART NO.	DESCRIPTION
			LIST OF MATERIALS
13	1	1-76-0193	RUBBER SUPPORT PAD
12	6	02-06-1152	"MOLEX"/EQUIV. FEMALE CRIMP PIN
11	1	03-06-1061	"MOLEX"/EQUIV. (6) PIN FEMALE CONN.
10	4	# 4	INT TOOTH LOCKWASHER
9	4	#4-40 x 3/16	PBHMS
8	1	23-0629	COVER
7	6	51-713-002	"SPECTRUM CONTROLS"/EQUIV. FEEDTHRU FILTER
6	1	# 2	INT TOOTH LOCKWASHER
5	1	#2-56 x 1/4	PBHMS
4	2	76-0001	SPACER
3	1	23-0594	SPECT. ANAL., P.C. BD # 2 ASSY.
2	1	23-0630	ENCLOSURE
1	1	23-0633	SPECT. ANAL. MODULE # 2 ASSY.

NOT SHOWN

NEXT ASSY	QTY	APPLICATION
23-0626	1	FM/AM 10005

TOLERANCES
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS APPLY AFTER FINISH
DECIMALS: .xx = ± .010 .xxx = ± .005
ANGLES: ± 1/2°
FRACTIONS: ± 1/64
SURFACE ROUGHNESS 125 ✓
REMOVE ALL BURRS

DRAWN LvC 7-19-77
CHECKED
APPROVED

MATERIAL: SEE L/M
FINISH: —

- IFR INC -
WICHITA, KANSAS

TITLE: SPECTRUM ANALYZER MODULE # 2 ASSY.
FM/AM-10005

SIZE C | PART NUMBER 3-23-0633 | REV C
SCALE NONE | WEIGHT — | SHEET 1 OF 2

Figure 6-95 (S)

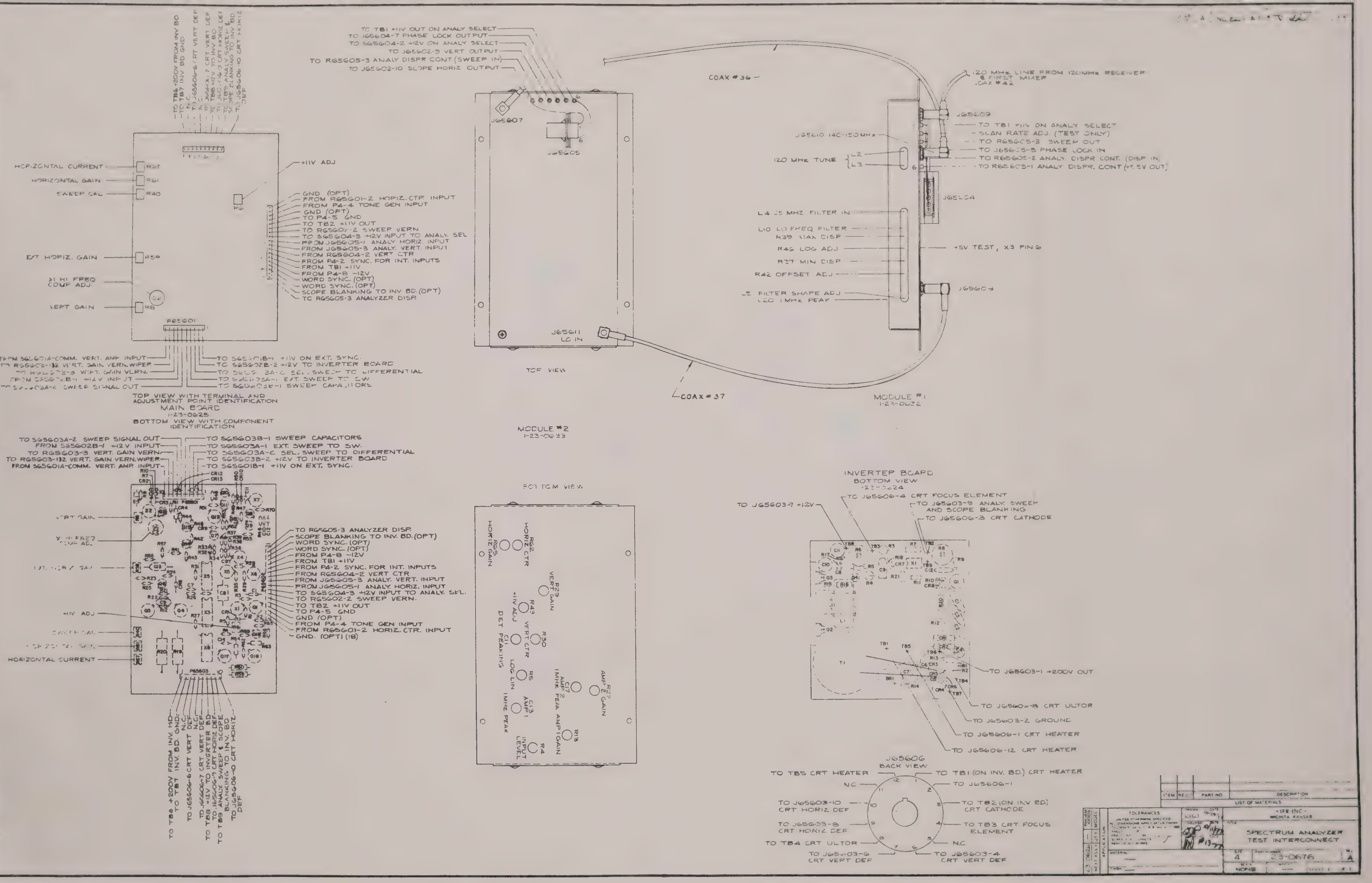

TO TB1 +11V OUT ON ANALY SELECT
TO J65604-7 PHASE LOCK OUTPUT
TO J65604-2 +12V ON ANALY SELECT
TO J65602-3 VERT OUTPUT
TO RG5605-3 ANALY DISPR CONT (SWEEP IN)
TO J65602-10 SCOPE HORIZ OUTPUT
COAX #36
120 MHz LINE FROM 120MHz RECEIVER & FIRST MIXER .CAX #42
J65609
TO TB1 +11V ON ANALY SELECT
SCAN RATE ADJ. (TEST ONLY)
TO RG5605-3 SWEEP OUT
TO J65605-3 PHASE LOCK IN
TO RG5605-2 ANALY. DISPR CONT. (DISP IN)
TO RG5605-1 ANALY DISPR. CONT (+5V OUT)
J65607
J65605
J65610 140-150MHz
120 MHz TUNE
L2
L3
J65604
L4 15 MHz FILTER IN
L10 LO FREQ FILTER
R39 MAX DISP
R46 LOG ADJ
R37 MIN DISP
R42 OFFSET ADJ
FILTER SHAPE ADJ
120 1MHz PEAK
+5V TEST, X3 PIN 6
J65603
J65611 LO IN
TOP VIEW
COAX #37
MODULE #1 1-23-0632
HORIZONTAL CURRENT
HORIZONTAL GAIN
SWEEP CAL
EXT HORIZ. GAIN
X1 HI FREQ COMP ADJ.
VERT GAIN
R67
R61
R40
R59
R58
C2
R6
+11V ADJ
P65601
GND (OPT)
FROM RG5601-2 HORIZ. CTR. INPUT
FROM P4-4 TONE GEN INPUT
GND (OPT)
TO P4-5 GND
TO TB2 +11V OUT
TO RG5604-2 SWEEP VERN
TO S65604-3 +12V INPUT TO ANALY. SEL
FROM J65605-1 ANALY HORIZ. INPUT
FROM J65605-3 ANALY. VERT. INPUT
FROM RG5604-2 VERT CTR
FROM P4-2 SYNC. FOR INT. INPUTS
FROM TB1 +11V
FROM P4-8 -12V
WORD SYNC. (OPT)
WORD SYNC. (OPT)
SCOPE BLANKING TO INV BD. (OPT)
TO RG5605-3 ANALYZER DISP
FROM S65601A-COMM. VERT. AMP INPUT
TO RG5605-132 VERT. GAIN VERN. WIPER
TO RG5605-3 VERT. GAIN VERN
FROM S65602B-1 +12V INPUT
TO S65603A-2 SWEEP SIGNAL OUT
TO S65601B-1 +11V ON EXT. SYNC.
TO S65602B-2 +12V TO INVERTER BOARD
TO S65603A-C SEL. SWEEP TO DIFFERENTIAL
TO S65603A-1 EXT. SWEEP TO SW.
TO S65603B-1 SWEEP CAPACITORS
TOP VIEW WITH TERMINAL AND ADJUSTMENT POINT IDENTIFICATION
MAIN BOARD 1-23-0625
BOTTOM VIEW WITH COMPONENT IDENTIFICATION
TO TB6 +200V FROM INV BD
TO TB7 INV BD GND
N.C.
TO J65606-6 CRT VERT DEF
TO J65606-7 CRT VERT DEF
TO TB8 +12V TO INVERTER BD
TO J65606-8 CRT HORIZ DEF
TO TB9 ANALY SWEEP & SCOPE BLANKING TO INV BD
TO J65606-10 CRT HORIZ DEF
MODULE #2 1-23-0633
BOTTOM VIEW
HORIZ GAIN
RG2 HORIZ CTR
R23 VERT GAIN
+11V ADJ
R43 VERT CTR
R30 LOG LIN
C17 1MHz PEAK AMP 2
R22 AMP 2 GAIN
C13 1MHz PEAK AMP 1
R4 INPUT LEVEL
DET PEAKING
INVERTER BOARD BOTTOM VIEW 1-23-0624
TO J65603-7 +12V
TO J65606-4 CRT FOCUS ELEMENT
TO J65603-9 ANALY. SWEEP AND SCOPE BLANKING
TO J65606-3 CRT CATHODE
TO J65603-1 +200V OUT
TO J65606-8 CRT ULTOR
TO J65603-2 GROUND
TO J65606-1 CRT HEATER
TO J65606-12 CRT HEATER
J65606 BACK VIEW
TO TB5 CRT HEATER
TO TB1 (ON INV. BD.) CRT HEATER
TO J65606-1
TO J65603-10 CRT HORIZ DEF
TO TB2 (ON INV BD) CRT CATHODE
TO J65603-9 CRT HORIZ DEF
TO TB3 CRT FOCUS ELEMENT
TO TB4 CRT ULTOR
N.C
TO J65603-6 CRT VERT DEF
TO J65603-4 CRT VERT DEF
ITEM
REF
PART NO
DESCRIPTION
LIST OF MATERIALS
TOLERANCES
-HP INC-
WICHITA KANSAS
SPECTRUM ANALYZER TEST INTERCONNECT
23-0676
NONE

Figure 6-96 (S)

DATE	REV	CHANGE	APP'D
10/6/77	A	INCORP. ECN # 2419 LC	MM
1/3/78	B	INC. ECN # 2570 AA.	WW
2/28/78	C	INC ECN 2709 JAT	WW

+15V
FL1
L1
22µH
C2
.01
C3
33µf
10V
R8
3.3K
R4
270
R3
1K
J62301
10 MHz IN
1V. RMS
COAX 38
C1
.001
Q1
2N3905
Q4
2N3905
R9
2.2K
C4
.001
R1
470
R13
470
J62305
COAX 11
TO
100 MHz
108 MHz.
MULTIPLIER
J62302
COAX 6
TO
CLOCK
DIVIDER
Q2
2N3646
R5
68
R10
68
Q5
2N3646
R2
470
R14
470
J62303
COAX 8
TO
FRONT
Q3
2N3646
R6
68
R11
68
Q6
2N3646
J62304
COAX 12
TO
2ND
MIXER DIODE
SW.
R7
220
R12
220
R15
470
23-0613

NOTES:
1. ALL RESISTORS ARE 1/8W, 10% AND VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS ARE IN µf UNLESS OTHERWISE SPECIFIED.

LAST USED NOS.
C4, R15, Q6, L1

ITEM	REQ'D	PART NO.	DESCRIPT

LIST OF MATERIALS

FSCM 10008	MODEL		
1	QTY		
23-0619	NEXT ASS'Y	APPLICATION	

TOLERANCES
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS APPLY AFTER FINISH
DECIMALS .xx = ± .010 .xxx = ± .005
ANGLES ± 1/2°
FRACTIONS ± 1/64
SURFACE ROUGHNESS 125 J
REMOVE ALL BURRS

MATERIAL
FINISH

DRAWN DATE TJT 6-27-77
CHECKED DATE WS 7-7-77
APPROVED DATE MD 7-8-77

- IFR INC -
WICHITA, KANSAS

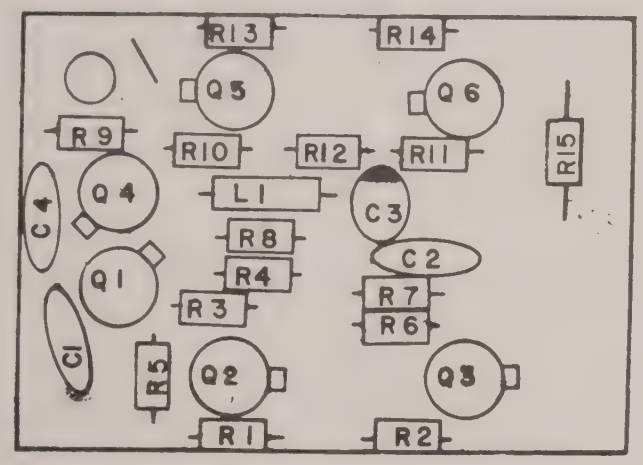
TITLE
TCXO
OUTPUT DISTRIBUTION
SCHEMATIC

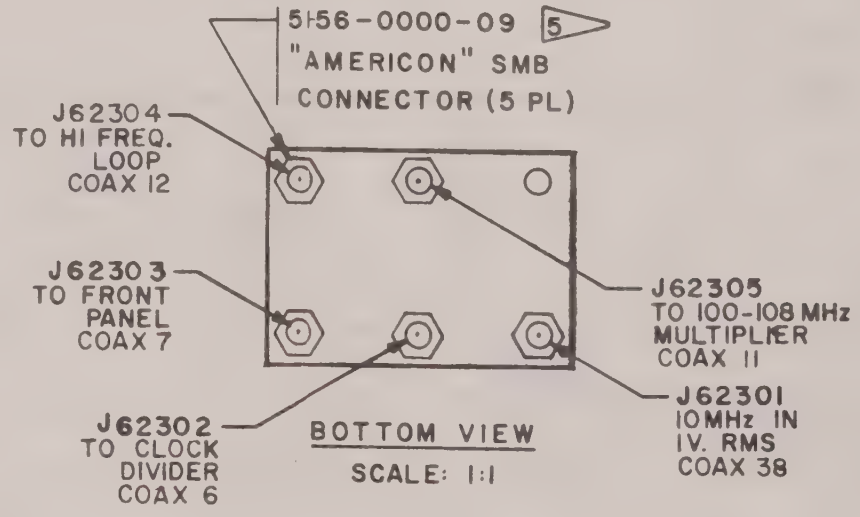
SIZE	PART NUMBER	REV
B	2-23-0623	C

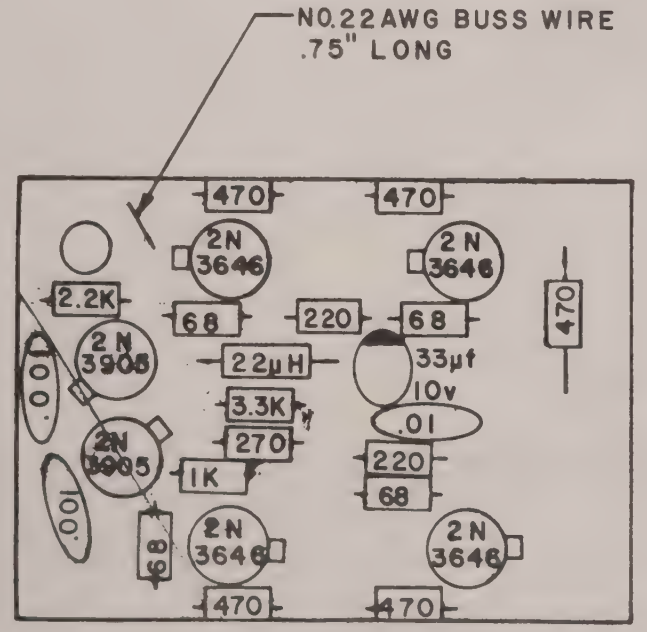
SCALE — WEIGHT — SHEET 1 OF 1

Figure 6-97 (S)

DATE	REV	CHANGE	APP'D
1/3/78	A	INC ECN # 2570 A.A.	WW
1-16-78	A-1	INC ECN 2709	WW







NOTES:

1. ALL RESISTORS ARE 1/8 W., 10% TOLERANCE EXCEPT AS NOTED.
2. ALL CAPACITOR VALUES ARE IN µF EXCEPT AS NOTED.
3. COMPONENT LEADS MAY EXTEND .04 TO .06 BEYOND BOTTOM OF BOARD AFTER SOLDERING.
4. MAXIMUM HEIGHT OF COMPONENTS TO BE .45 FROM COMPONENT SIDE OF BOARD.

5 TEFLON INSULATOR MUST BE CUT FLUSH WITH BASE OF CONNECTOR.

NEXT ASS'Y	QT'Y	MODEL	ITEM	REQ'D	PART NO.	DESCRIPTION
23-0620	1	FM/AM1000S				
			1	1	23-0619	TCXO P.C. BD ASS'Y

APPLICATION — LIST OF MATERIALS

TOLERANCES
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS APPLY AFTER FINISH
DECIMALS: ± .005
ANGLES: ± 1/2°
FRACTIONS: ± 1/64
SURFACE ROUGHNESS 125
REMOVE ALL BURRS

DRAWN DATE: RKK 3/18/77
CHECKED DATE: WW 4-8-77
APPROVED DATE: MA 4-9-77

MATERIAL
TREATMENT
FINISH

INSTRUMENT FLIGHT RESEARCH CORPORATION
WICHITA, KANSAS

TITLE: TCXO OUTPUT DIST. AMP ASS'Y

SIZE: B | PART NUMBER: 2-23-0619 | REV: A-1

SCALE: 2:1 & NOTED | WEIGHT: —— | SHEET 1 OF 1

Figure 6-98 (S)

MP MASTER
MA26162